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ON THE USE OF MARL AS MANURE.

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[Continued from page 696.]

Among so many different practices, we may nevertheless arrive at an estimate of a reasonable dressing of marl, for soils of middling consistence, which then may be altered as circumstances require: it will be a great service rendered to practice, even to approach thus near to the precise directions which are so much wanted.

The object of marling, is to give to a soil the qualities and advantages of a calcareous soil. Then the analysis of the best calcareous soils, of the best soils of Flanders among others—the practice of the countries where marling is the most ancient, and the best regulated—the dressings that Thaër advises—the summary of numerous marlings given by Arthur Young—all have made us conclude, in the *Essay on Marl*,* that the proportion of 3 per cent. of carbonate of lime, in the tilled layer of soil, on an average, ought to suffice. But marl more or less rich, and tillage more or less deep, either or both, would require variations in the quantities of marl, to preserve a fixed proportion of carbonate of lime in the soil.

To facilitate the application of this rule, derived from experience and reasoning, we give a table which contains all the elements of marling, and of which it will be easy to make use. It is made for marl of all degrees of richness, from 10 to 90 per cent. of carbonate of lime, and for all depths of ploughing from 3 to 8 inches. By taking the intermediate averages, we will have, for every depth of ploughing, and for every quality of marl, the number of cubic feet to carry upon a hectare of land. The cubic feet are estimated by the capacity of the carts; because the marl, in crumbling afterwards upon the soils, acquires as much bulk as it occupied in lumps in the carts, with the vacant spaces between the lumps.†

When the marl contains of carbonate of lime.	Number of cubic feet of marl necessary (per hectare) to a tilled layer of the depth of					
	3 inches.	4 inches.	5 inches.	6 inches.	7 inches.	8 inches.
per cent.	cubic feet.	cubic feet.	cubic feet.	cubic feet.	cubic feet.	cubic feet.
10	7.106	9.474	11.842	14.212	16.580	18.948
20	3.553	4.737	5.921	7.101	8.290	9.424
30	2.368	3.158	3.947	4.737	5.527	6.316
40	1.776	2.368	2.860	3.552	4.144	4.736
50	1.420	1.880	2.350	2.820	3.290	3.720
60	1.178	1.570	1.962	2.354	2.748	3.140
70	1.020	1.360	1.700	2.040	2.380	2.720
80	888	1.184	1.480	1.776	2.072	2.368
90	775	1.032	1.292	1.550	1 809	2.027 ‡

* *Essai sur la marne*, the original work of M. Puvis, referred to in the introductory remarks to this translation.

† The proportion of three per cent. of carbonate lime is far too much for safe and profitable dressings. One-third of that quantity is most generally enough, and it would very often do injury to exceed this proportion. It is true that no fixed proportion can be universally applied—and three per cent. may in some cases be given with safety and advantage, and in others, one per cent. would be hurtful. Still, if any general average may be assumed, after making due allowance for causes for exceptions to the general rule, our experience would fix on *one per cent.* as abundantly high for that average dressing. This is for the *acid*, or naturally inferior soils of Virginia, where marling in proper proportions does most good—and most harm, if applied improperly, or in excess. On better soils, having more lime naturally, marl will be of far less service, but may be applied in heavier dressings, without damage to the soil. It is probable that many of the marled soils in Europe are of the latter kind.

‡ The marling table of our author, is on a good plan to aid calculation, but it is nearly useless to the American reader, not only for assuming 3 per cent. as a suitable dressing, but because the land is measured by hectares, and the marl by cubic feet, an unusual measure little suited to the practice of farmers, and still less as the French linear foot is to ours as 1.066 to 1.000. For these reasons, the table would have been rejected, and substituted by another, but for an unwillingness to alter the author's text; and especially as he refers to some of its particulars afterwards. The following table is constructed upon a plan suited for

But this average dressing, [giving 3 per cent. of carbonate of lime to the soil,] ought still to vary in many cases. If the marl is argillaceous, or on argillaceous soil, the dose ought to be diminished. When a soil of this kind, marled heavily with argillaceous marl, is worked after rain, it is made into a sort of mortar, which hardens, and becomes like brick, in drying, and which does not afterwards crumble but with rain.*

Still more ought the dose of marl to be diminished in proportion to the lightness of the soil, and we think that it ought to be lowered almost to that of Sologne (250 cubic feet to the hectare,) a quantity which we regard as reasonable, and as directed by experience ,as much as by economy, on very light soils. On the contrary, the proportion ought to increase with the humidity of the soil. In a very moist soil, a small dressing might not suffice: but nevertheless, it is necessary to guard against making the soil too argillaceous.

Precautions necessary to be taken in marling.

The first requisite for the success of marling, is that the soil should be well drained, and be able to rid itself of the surface water. Marl doubtless may effect much; but it is not sufficient of itself, to put in good condition [*assainer*] a marshy soil. Like lime, it cannot exercise its action, but when the soil, by its natural texture or position, or by means of labor applied to it, can free itself from superabundant water.

The carting of marl ought to be done in good weather, in order that the ground may not be poached and kneaded under the feet of the teams and the men, and the wheels of the carts. It should be either in a dry season, or when the earth is frozen. However, if the roads are good, we may profit by every leisure time of the teams, in drawing marl upon a corner of the piece to be marled, to be put over the ground afterwards by

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our use, and with the more proper quantity of one per cent. of carbonate of lime, as the proportion to be added. The land measure is the English acre, and for the marl, the Winchester bushel, both being used in Virginia. Though the measure here is of course the even bushel, (of 2150 three-fifths cubic inches,) and marl, in practice, is measured heaping, in truth the two measures do not vary much, as the measure loosely heaped when filled, would not be more than even, when settled by standing, or by being jolted in the journey of the cart. A glance at this table will direct what number of bushels of marl, of any degree of strength between ten per cent. and one hundred, will give one per cent. of carbonate of lime to any depth of tilled soil, from three to eight inches. For example, of marl of thirty per cent. mixed with six inches depth of soil, five hundred and eighty-three bushels would be required for the acre; and of marl of eighty per cent. in a soil ploughed only four inches, one hundred and forty-five bushels would give the same proportion.

When the marl contains of carbonate of lime per ct.	*Number of bushels of marl necessary to give one per cent. of carbonate of lime to an acre for a ploughed depth of soil of*					
	3 inches.	4 inches.	5 inches.	6 inches.	7 inches.	8 inches.
10	875.10 †	1166.80	1458.50	1750.20	2041.90	2333.60
20	437.55	583.40	729.25	875.10	1020.95	1166.80
30	291.70	388.93	486.17	583.40	680.63	777.87
40	218.77	291.70	364.62	437.55	510.47	583.40
50	175.02	233.36	291.70	350.04	409.38	466.72
60	145.85	194.46	243.08	291.70	340.31	388.93
70	125.01	180.97	208.36	250.03	291.70	333.37
80	109.38	145.85	182.31	218.77	255.23	291.70
90	97.23	129.64	162.05	194.46	226.88	259.29
100	87.51	116.68	145.85	175.02	204.19	233.36

* This effect is a proof of the dose of marl being improperly heavy, independent of the particular facts named. If no more carbonate of lime is applied than is serviceable, its action is almost wholly *chemical*—and one part of that action is to make clay soils lighter, and sandy soils more stiff and adhesive—and so strong is this chemical action, that it over-balances the mechanical action of the sand or clay, which form the larger part of the marl. Thus, a marl though very sandy, will still stiffen a sandy soil—and one though argillacious, will lighten a compact and close clay soil. But if these marls are applied in thrice the quantities required for chemical action, then two thirds of the quantity are in excess—and exert mechanical power only. Then, if sandy, this excess of marl increases the lightness of soil, and if argillacious, makes the soil more so than before, and it may be, to a very hurtful extent.

† The fractional parts of bushels are *hundreths*.

tumbrils, or wheelbarrows. The exposure of marl to the air before spreading it, is always useful, but not indispensable.*

On a moist soil, it is expedient to precede the marling by a deep ploughing, because that then is there offered to the water, a thicker permeable layer of earth; there will be less injury from the excess of moisture, and the layer meliorated and mellowed by marl, will also be deeper.

The marl ought to be placed upon the ground in parallel lines, in small and equal heaps, at 20 feet distance between the heaps and between the lines. Advantage should be taken of the first leisure time in good weather, to spread the marl, as regularly as possible. After some days, and alterations of sunshine and rain, the ground should be passed over again to equalize the marl, and to make what has crumbled to powder cover as much ground as possible; the amount and quickness of the good effects depend much on this care. The layer of marl, is then left to be aired upon the ground as long as possible: there is established a reciprocal action, by aid of the air, and atmospherical variations, of the surface of the soil and the marl, which prepares for the effects—hastens, and gives them more energy.

Marl ought not to be covered by the plough except when it is well crumbled, and almost dry. In burying it wet, it resumes its adhesion and forms lumps, and it cannot be diffused through the soil. That ploughing also should be shallow, because the marl is then kept in the layer of vegetable mould, for the benefit of the succeeding culture.

When the marling has been too heavy, by a deeper ploughing we may bring to the surface the earth not marled, which being mixed, diminishes the proportion of marl. This operation, by increasing the depth of the tilth, lessens the injuries produced to the soil by heavy rains.

Marl is used with advantage upon winter crops, as well as those of spring. It is very usefully employed in compost, whether with farm-yard manure, or with mould or sods. However, these composts if made with clay marl are a little more troublesome to make and to arrange afterwards, than if made with stony marl. The English make much use of marl in this mode, especially when it is distant from the fields where its application is wanted—because for marl, as well as for lime, by composts the effects of small doses are much increased.

The effects of marl are not always very perceptible upon the first crops; and that occurs when it has been spread with little care, or has not been mingled with the soil by proper tillage—when it has been buried [wet] by the rain, or by a too deep ploughing—or finally, when there has followed the dressing an uninterrupted succession of rainy, or of dry weather. It is neeessary there should be an alternation of heat and moisture that the combinations, (by the aid of which marl acts on vegetables,) may be formed in the soil.

*The advantage stated to be derived from letting the heaps of marl stand to be crumbled, belongs to a clayey or chalky texture, and very rarely, and then but slightly, to our marl of fossil shells in Virginia.

Of the effects of marl upon vegetation, and upon the soil.

The effects of marl upon the soil resemble much those of lime: it is still the creation of calcareous soil and its products. Marl promotes the growth of all the families of cultivated plants: however, its effect upon the grains of small culture [*grains menus*] and upon forage crops, is more considerable than upon cereal plants. It increases, by at least twice the amount of the seed, on an average, the product of winter grains—but it almost doubles the products of the smaller crops of barley, Indian corn, and clover. The marling of oats produces a vigorous growth; but the leafing time is prolonged, and less grain is formed. Winter wheat, sown *par le sec*, is subject to lodge, as on calcareous soil: in place of the grain being plump, yellow, and thin skinned, as on limed land, marled land produces grain that is more long, grayish, dull, and which yields more bran. Sandy marl yields more grain—clay marl more stalk or forage.†

The dogstooth, *l'avoine a chapelet*, the bent grasses [*agnostis*] the small grasses, pests of culture on silicious soils, disappear after marling, and give place to the small leguminous and other plants of calcareous soils.

French agriculture makes little use of marl on meadows: English agriculture, on the contrary, uses it with advantage on pasture land and the meadows not irrigated. But it is rather the marl in compost, than the marl alone, which serves for this use—and the stony, rather than the argillaceous marl.

The characters which marled soils exhibit are very similar to those of limed soils, and naturally calcareous soils—but more similar to the latter. The doses given by limings. which are scarcely a tenth of the quantities of carbonate of lime applied in marlings, do not so essentially change the appearance of the soil. The marled soil, like the calcareous, hardens and contracts with drought—and then splits and crumbles with rain or heavy dews.‡ Marled land acquires a reddish color,* and

†The last sentence serves to explain and correct the preceding passage, and to accord with the truth stated in the first lines of the paragraph, that both *liming and marling are merely the creating a calcureous soil*—and to maintain the plain inference, that the effects on vegetation, should be the same. The small increase attributed above (and in other parts of the text,) to marling wheat, &c. compared to the far greater known effects in Virginia, from lighter dressings, show that the soils in France are not so deficient in lime, and therefore not so fit to be benefited by the application of marl. Again—if the grain of wheat is in truth made less perfect by marling than by liming, the difference of effect must be caused not by the marl which acts as carbonate of lime, (chemically,) but by the excess of the dressing, which acts mechanically, and merely as so much clay or sand, according to the texture of the marl.

‡These are additional marks of a soil too highly calcareous, or too heavily marled. No such effects follow

presents an open or spongy [*cariee*] surface, in place of the white color and glazed surface of the *white lands* [*terrain blanc.*] The soil, made mellow, may be tilled in every sense—crumbles with the first rain, and becomes more accessible, as well as the plants which it bears, to all atmospheric influences. The roots traverse the marled and more permeable soil more easily—and the juices which form the sap can circulate, and consequently be more easily absorbed by the roots. It may be well conceived that all these new qualities render the soil, and its products, better. We refer, for the balance of this subject, to what we have said upon lime, as the same will apply very nearly to marl.*

Of second marlings.

We now arrive at a long disputed subject, and upon which it will be perhaps more easy to be understood.

Second marlings do not suit, and ought to be long deferred, where the first has been abundant. If they have not succeeded in Ain, in Isere, in Yonne, it is because in the first marlings there were applied doses which furnished to the soils, 4, 5, 6, 8, 10 per cent. of carbonate of lime—any of which proportions is much beyond what was wanting, and often beyond what was advantageous, and which addition has been held by the soil for an indefinite time. But in places where marling has become a regular operation of agriculture, we may take points of departure which will enlighten us. In the marlings the most regular and the most ancient of the classic husbandry of the department of the North, the soil receives every 20 years on an average, 160 hectolitres [to the hectare] of stony marl, which contains three-fourths at least of carbonate of lime. This then is 6 hectolitres a year, of carbonate of lime, which is given to the Flemish soil, to make it continue to produce with the same energy.†

A quantity which would suffice for argillacious soils, is too heavy for light soils. We have seen that they give in Sologne every 10 years, from 240 to 300 cubic feet, to the hectare, of marl which contains 40 per cent. of carbonate of lime. This is 4 hectolitres, a year, of the calcareous principle. It would seem then, that the soil and vegetation absorb, or consume, from 4 to 6 hectolitres of carbonate of lime, to the hectare a year. Our second marlings should then be given in such manner as to furnish to the soil for each year, from 4 to 6 hectolitres of carbonate of lime, according to the consistence of the soil, in the operations which are repeated every 20 or 30 years. (These results would doubtless simplify much the question of marling, and its application to soils of different natures.) The life of man is generally too short to enable him to be sufficiently enlightened by comparisons—and one has an immense advantage when a great work, like marling, can be placed upon the exact results of long continued and enlightened practice, such as we can now refer to.

If we compare this result to that which we have found for second limings, we will conclude that the soil and its plants seem to demand a greater quantity of carbonate of lime—than of lime, since 3 hectolitres of lime, on an average, suffice for the hectare, in place of 5, on an average, of carbonate of lime, which quantity is required for second marlings. But subtracting the proportion of carbonic acid from the carbonate of lime, there is given 3 hectolitres of lime in this case, as well as in the other; which is a very remarkable coincidence, and a guarantee of the correctness of our lights upon lime and marl.‡

We will remark that with the dose of marl which we have advised, giving 3 per cent. of carbonate of lime to the soil, a ploughed depth of 4 inches, receives 960 cubic feet of marl, or 320 hectolitres; which would furnish, for more than 60 years, an annual consumption of 5 hectolitres of carbonate of lime. At the end of 40 or 50 years, the first dressing, enfeebled, would demand a second marling, which would be sufficient, if, at most, of half the amount of the first dressing.

The dose of marl which we advise as seemingly the most suitable for our moist soils, might then [for the dry,] according to circumstances, with much economy, be lessened by half—perhaps by two-thirds; it would still be almost triple the dose that is applied in Sologne.

We are far from admitting that all the calcareous compound disappears in the interval of time, which separates the successive marlings. A part of it is carried away by the waters—another part buried by deep ploughing—and a still greater part enters into new combinations: but still there certainly remains a part at the end of the whole period.

The formation and the products of vegetables, on a hectare of limed land, of which the products are comparable, do not take up, as we have seen, but half a hectolitre a year.† We think then, that with the doses of the first and second marlings, which we still advise, rather than with those of the limings, the soil will arrive at containing such an amount of calcareous principle, that nothing will be gained by augmenting it; and which will

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a merely sufficient dressing—and on the contrary, marled land is enabled much better to resist the injuries of drought, as well as of moisture,

* See M. Puvis' Essay on the use of lime, in Nos. 6 and 7, of the Farmers' Register, Vol. III.

† Rather less than 6 bushels to the acre. See the exact measures of the hectolitre and hectare, and compared with the bushel and acre, p. 863, note, Vol. III Farmers' Register.

‡ This is a mistake of calculation, which is not a little remarkable, to be made by our author. The hectolitre is a measure of capacity—and the lime is measured by it in the stone, not slaked. Of course, though *weighing* less by about two-fifths, than when carbonate of lime, or before being burnt, it does not measure less on account of being deprived of its carbonic acid. But though reached by incorrect reasoning in this particular, the author's conclusion is sound, that a certain quantity of lime given in marl, is just as fertilizing as if given alone, or in any other form. The usual difference in favor of the early action of lime, is owing to its more perfect separation of parts, and its quicker diffusibility through the soil.

† See p. 390, Vol III. Farmers' Register.

prevent a renewal being required for many generations, during which the whole system of marling will be forgotten. Then, after the exhausting of the calcareous principle, and after the need of it being long experienced, marling will be recommenced as a novelty. Our soil and our country in which these operations had place in very ancient times, have seen, I think, such periods to pass, and to be renewed.

It may be conceived that, by the annual consumption of lime by growing plants, it may happen that soils to which nature had given a small proportion, may cease to contain it in their upper layer. But the period which will remove their lime, is, doubtless very long. A deeper ploughing may bring back to them, as much as a succession of generations was required to take away. Besides, we think that, especially on calcareous soils themselves, the soil and vegetation may form a part of this proportion of the calcareous principle, [taken up by growing plants,] which they spontaneously form entirely in soils not calcareous, as we have seen when treating on lime.

Exhaustion of the soil by marling.

When on a light or very dry soil, a heavy dressing of marl has been laid, and there is not given to it animal [or other putrescent] manure in proportion to the products taken off—and still more when the crops are of an exhausting kind—the products are found to be gradually diminished. The land preserves the principal characters of calcareous soil—but of the calcareous soils of little fertility. It still produces more than before the marling—but it is said to be exhausted, and a new dose of marl does not being back its former fertility. We have seen this case to occur in Isere, where all unfavorable circumstances are found combined. In clay soils this result would be produced with more difficulty, and after a long time. Marl then does not make dung unnecessary—but still it is far from exhausting the soil. To the contrary, we think, that to maintain the continuance of heavy crops, a much less amount of putrescent manure is required, than to obtain the like products from soils not marled. The marl then doubles the action of the putrescent manure—they reciprocally support each other—and the land of middling quality acquires this advantage characteristic of good soils, of being able to produce much, with but a moderate quantity of manure.‡

Nevertheless, we ought to say that the first marling, and the new liming, create a first spring of fertility, which is not afterwards sustained in its full power. That this should be, it would be requisite that, the same year of the marling even, the putrescent manure should have been applied as usual; or that the marl should be given in compost, without lessening the amount of other manure, as is done in many second marlings in England. But this procedure rarely takes place: every where, the farmer chooses to profit by the new faculty given to the soil, of producing without dung—and therefore places his putrescent manure on other ground which has not yet received marl. However, Belgium, the department of the North, Normandy, La Sarthe, and a great part of England, have with care, sustained the first fertility given by marl or lime; and that result is due both to the quantity of manure, and the good culture given to the lands marled or limed.

Of the cultivation of the soil after marling.

After all that we have said, it will be understood that the culture of the soil, after marling, ought to be conducted with discernment and moderation. The new fertility of the soil should be profited by, in economizing the artificial forces bestowed by marling. It is necessary to return manure in proportion to the products obtained, and consequently, to multiply grass and root crops—in short, to direct the new productiveness of the soil, as much to the advantage of manure-making animals, as to the increase of grain crops. Then marl is an immense means of fertility, present, and to come.

For the purpose of arriving at these essential modifications of culture, we would not advise a sudden change in the term of the rotation of crops. Such a change is difficult and delicate, and demands much time and expense—and it may be deferred, or even avoided altogether, if the obstacles are

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‡ This is precisely the conclusion reached, though by a different course of reasoning, by the doctrine of the power of carbonate of lime to combine putrescent manures with soil, and thereby preserve them from waste. Marl does not *directly* "double the action of manure"—but it does so effectually *indirectly*, by not permitting any loss of the putrescent matter, and saving the whole for the sustenance of plants.

"Marl particularly suits soils not calcareous, and which are cold and moist, without being marshy. Whatever may be the cause of humidity—whether it be due to an impermeable subsoil, to being on a plain without slope, or to waters coming out of the earth—the humidity engenders an acid which accumulates *humus* (or vegetable mould:) the earth there is dormant, [*paresseuse*,] without activity: marl, when there applied, gives to the soil heat and energy, so as in some degree to dry it—uses the accumulated humus, and doubles the effect of the dung which may be afterwards given." *Essai sur la marne*, p, 27.

In this passage of his earlier work, the author fully recognizes the formation of vegetable acid in soil, and a beneficial counteracting action of marl, which would be worth all the other effects which he attributes to it. Yet so little value does he attach to this most important doctrine of acid being found in soil, and which he had correctly then advanced, that no allusion to it is contained in his last edition, of which the translation is here given. If we had met with the passage just quoted, before striving to prove the same doctrine, it would have been adduced as good authority: but the author's subsequent silence, amounting to neglect, if not rejection of it, deprives it of all force, so far as resting on his opinion. Thus it often has happened that agricultural writers have stumbled upon truths of far greater value than those who asserted them knew of, and which were afterwards dropped and forgotten, as easily, and with as little reason, as they had been at first assumed. We may find in detached sentences in agriculture, testimony to support almost any opinion—but the sifting and comparison of such evidences will often show that they are either contradicted by those who had uttered them, or deemed of no importance, even if any definite meaning was in truth attached.

very considerable. In every system of cultivation, crops productive of manure may be introduced, [without altering the term, or the principal characters of the existing rotation.]

When, after a certain period of time, notwithstanding the attention to good culture and abundant manurings, the productiveness lessens—when the dog-tooth, bent-grass, and the plants belonging to silicious soils re-appear—it is time then to recur anew to marl, but to an extent of half, at most, of the first dressing. By this means, with good culture, the first fertility will be sustained, as we have seen done in the countries where the system of agriculture is the most perfect.

Theory of they effects of marl on the soil.

The theory which we have developed to explain the action of lime upon soil, applies nearly entire to marl:* the active principle is the same in both—therefore the results are similar. It follows then, that in marling, as before stated of lime, the calcareous principle gives to soils and to vegetables a greater power of absorption from the atmosphere—of drawing from it the volatile principles, hydrogen, oxygen, azote, and carbon. Marl, like lime, increases then the faculty which both the soil and vegetables have of forming the fixed principles of plants—the salts and earths—whether it be that the elements of these principles are taken in the atmosphere, in the soil itself, or in both. Once being given, this power of absorption would be, doubtless, one of the greatest means by which calcareous agents fertilize soils.†

* See pp. 386 to 390, Vol. III. Farmers' Register.

† The last pages have presented several opinions which are opposed either in appearance, or reality, to views maintained in the *Essay on Calcareous Manures*. To the attentive readers of that work, it may be unnecessary to add any thing in explanation: but to very many others, these doctrines of M. Puvis, would seem to be admitted as sound, if inserted here, without contradiction or comment. But still we cannot for this purpose occupy the space necessary for a full exposition, and which indeed would be but to repeat, and at great length, what has been stated in the work just referred to.

In addition to objecting to the amount of the first dressings of marl, recommended by M. Puvis, we deny the necessity of their being repeated, on his ground of the dose being exhausted by the several causes which he has named. Considering that a proper dose of lime (in whatever form applied) becomes chemically combined with the soil, we deny the power of rain water to carry it off, or to sink it below the upper soil—or that any thing else can take any portion of it from its combination with the soil, except the power of vegetation, which takes up the small portion necessary to form and perfect plants. This one cause of waste was admitted in the *Essay on Calcareous Manures*. M. Puvis estimates its amount at half a hectolitre to the hectare, which is a trifle more than half a bushel to an acre. Dundonald estimated the same at 80 pounds of calcareous matter to the acre. Both estimates are no doubt made on very uncertain grounds. But *something* certainly is so lost, in all the vegetable products carried from the land. Proceeding on M. Puvis' estimate, it would require 300 crops to be entirely removed, to exhaust an acre of 150 bushels of the carbonate of lime previously applied. But if all the offal product of the field had been brought back, in the shape of manure, half of this loss would have been replaced, so as to require 600 crops to take all away—and the addition of one peck of carbonate of lime annually to each acre, with this manure, or half a bushel without it, would replace the whole actual waste. This admission (or even on Dundonald's larger estimate,) is scarcely to be considered as contradicting the position we have elsewhere maintained, of the permanency of calcareous manures.

Our author's theory of the action of calcareous manures in general, is insufficient. His position that soils and plants can form and produce a portion of the calcareous principle required, is contrary to all sound reasoning, as well as to his own views of the continual and considerable waste of that principle in soils.

Instead of the calcareous matter given to a soil (in suitable proportion,) sinking below the access of the roots of plants, and leaving the upper layer of earth more destitute than the subsoil, the contrary result is derivable from reasoning, and is sustained by the actual condition of natural soils. Even if the calcareous matter (by possibility,) was actually below, and the surface soil was nearly destitute of lime in every form, the roots of the growing plants would continually draw up what is so necessary for their healthy support. The roots of grasses might not penetrate very deeply—but those of trees would seek and draw up the lime from 20 feet of depth. The greater part of this lime would be carried by the sap to form part of the plants above the ground—and their death and decay would leave it on and near the surface. Thus, in soils scantily, or but sufficiently, supplied with lime, nature is continually working to keep the supply at and near the surface. Hence the formation of what is called *soil*, and its fertility—and also the general sterility of the subsoil.

But notwithstanding these and other objections to the theory of M. Puvis, and to those of his opinions made erroneous either by being deduced from his theory, or by his relying on the incorrect statements of other persons, his views and his facts are regarded as generally and strongly sustaining such as we have before presented—and it is cause for much gratification that support should have been found to such extent, and proceeding from a source so much entitled to respect.

DESULTORY REMARKS ON THE MAKING OF TOBACCO.

Greenfield, Nottoway,
Feb. 12, 1836.

To the Editor of the Farmers' Register.

As you have made considerable complaints of late against your patrons for their neglect in sending their *original* communications to your Register, I have concluded this day to break the ice, as the old saying is—(for there is enough in this county

at this time, to fill every icehouse in Virginia; also my ink in the pen has occasionally become ice within the last three or four days,) and to give you some of my own ideas on tobacco.

In the impropriety of indiscriminently cultivating it in those sections of the state where it is made, I am fully aware, that a majority of the growers of this plant will not agree with me; and whether they do or not, it is perfectly immaterial. That shall not prevent me from pointing out those who should make it, and those who should not. I never can believe, taking every expense into consideration, and the almost uniform neglect of other crops, that there has been as much money made from its cultivation, as many have supposed, more particularly within the last thirty or forty years—my reasons are these; in the first place, our land generally is much poorer, requiring in many instances, double the quantity of land, and consequently double the quantity of labor with the consequent expenses. There were also, then much fewer overseers to divide the profits with. Every planter, with but few exceptions, who had from two to eight or ten hands, attended to his own business, and made his sons work, which superseded the necessity of so many overseers. In the present enlightened days of our comparative worn out land, things are very materially reversed. For me to point them out in detail, I am sure would be imposing on the good understanding of your numerous, intelligent, and respectable subscribers. I am clearly of an opinion that every cultivator of the soil, should *consult the nature and disposition of his land, and at the same time, make a proper estimate of the nature and expense of his hands; and proceed to its cultivation accordingly, even if it is only to make black eyed-peas.*

I believe it will be admited by all, that it requires the richest land and the most valuable hands, assisted by unceasing industry and good management, to make tobacco that which will yield a handsome profit.

How many in the present day are there, who possess all the necessary requisites? But few I can answer, when compared to the large bulk of dabblers in the tobacco plant. Within the last two years, there are men actually attempting, and do really think, that they are going to become rich, immensely rich, from making tobacco who scarcely know a tobacco plant from a mullein plant. Vain hope! deluded men!—Where is your land? Where are your barns, and where is your firewood?—If you rent or lease, and hire negroes to work the land at the present high prices of hired negroes, ruin will be the inevitable consequence. It is really amusing to see and to hear many such characters speak of what, they say, they can afford to give for rented land, and hired negroes, to make this precious and all-valuable plant. They speak of making tobacco (for they think and talk of no other staple commodity,) as if they had the command of the clouds. Some of them, to have the appearance of wealth and farming consequence, will employ overseers without showing them their farms; (sometimes they are to rent, and perhaps most of the hands to hire.) What is the consequence? Their bargain with their overseers must be complied with. How is this to be done? Why the employers, to keep up appearances, must (very often) run to every hiring in their reach, to get their number of hands to comply with their contracts. Just such characters have been the cause of negroes hiring so very high this year, so much higher than the nett proceeds of our farms will justify. But they say we are going to make tobacco. Now mark the consequence. These very identical men, nine, I may say, out of ten, at the close of the year, after the proceeds of their crops are ascertained, will not be able to afford their overseers all of their own part, much less to pay the hire of their tobacco-negroes; all of their tobacco-money must be paid for corn and meat, and contingent expenses. It not unfrequently happens that their corn-crib is "rat-proof" by planting corn time, and their meat-houses destitute of the little flies which buz about the first warm season in March, to lay their maggot-eggs. I have seen tobacco sell years past, as high as it does at this time; and as high as it probably will this year. I saw people then lay the foundation for their ruin, and I shall be greatly mistaken, if I do not see them again in the same situation before * * * * * * * * * gets the vote of Virginia, for the Presidential chair.

Whilst I am constrained to ridicule the promiscuous and indiscriminate cultivation of tobacco, I am fully sensible there are many, very many planters, getting rich from its cultivation. They are not cutting down, in waste, every little piece of wood-land which they know should be reserved and used *sparingly* for rail timber. They are raising manure and making rich lots—making plenty of grain also, to raise their own hogs and horses without taking their tobacco-money to buy them. They are not running to hirings and giving from *eighty to ninety dollars* for negro men, and other hands in proportion. No, sir, they are cool calculators. They will not run into such *wild speculations*, regardless of consequences. They prefer smaller lots, made rich with fewer hands to work them, than to keep up this great, great appearance of cultivating their tens and tens of thousands of hills of poor land, with a train of high-priced hirelings. They brag not of the immensity of ground they have in cultivation, but they are perfectly satisfied with the fertility of their smaller fields, the good management thereon displayed, and, what is better than all, they are perfectly satisfied with the nett proceeds therefrom arising.

I will now state as briefly as possible, my views on the making and management of the tobacco crop. It will be admitted by all, that the tobacco crop is attended with much more labor, trouble, expense and uncertainty, conjointly, than both the corn and wheat crop. As this is admitted, we should not give it such precedence over the other two staples of life. In the making of tobacco, in the first place, our land should be rich, and well adapted to its culture. We should have good barns affording sufficient room, and quite airy. Experience has taught me that early cutting and curing do not require half the firing as has been recommended by many writers on tobacco; provided, the barns are roomy and airy, and the weather *suitable.* In warm and moist weather even when the tobacco is cured, it should be dried by small fires; otherwise, it will very apt to mould. When the air in dry weather can freely pass between the tobacco while hanging, it seems to impart an invigorating substance quite discoverable in the tobacco. It certainly does in the months of August and September, possess *a curative* process

which supersedes greatly, the custom of so much firing. I will admit to cure tobacco in this way requires nearly double the house-room—but the question is, had we not better have this extra room, than to subject our barns to so much imminent danger by so constant firing? The seasons are all-important also, in making good tobacco. Unless we can have them as the growing crop requires, we may not expect to make good tobacco. It must be made good and cut ripe before housing: if not, it cannot be made so afterwards. I would respectfully refer those who wish to know the *very time* when tobacco should be cut, to Mr. Jordan Floyd's treatise on tobacco. It can be bought at the book stores in Petersburg. It possesses much more interesting and useful instructions, than I am able to impart, without being guilty of plagiarism. I shall content myself then by saying, as soon as my tobacco is cut and put on sticks, say from eight to fifteen plants, agreeably to size, it is carried directly to the barn, the sticks hoisted from seven to eight inches apart. Fires are immediately put under it, about ninety degrees temperature, continued at this as near as possible for the first twenty-four hours; then raised to about one hundred and ten degrees, and kept at that until the leaf of the tobacco is entirely dried—which is generally effected in forty-eight hours, if the weather is warm and sultry: I then raise the fires higher, (say one hundred and twenty to one hundred and thirty degrees,) and keep them going until the stem and stalk are perfectly cured; but if the weather is close and windy, I stop my fires after the leaf is cured, and fire no more, unless damp and warm weather should ensue. When we can cure our tobacco in this way, it seems to me, that the leaf ever afterwards, possesses more life and elasticity, than when it is cured by a long continuation of fires. Any time after the stem of the tobacco is cured, it may be stripped, and the leaf, or what is called "passable" tobacco, may be tied in bundles from five to eight leaves, agreeably to size. I then hang them on sticks, putting about thirty bundles, on a stick, which are afterwards hoisted in the barns pretty close together to prevent their coming very high in order; where they remain until in "spring season." Experience has taught me, that tobacco prized from winter seasons, will not do to open late in the spring or summer. It will be uniformly too high, and will most assuredly rot, if not opened and dryed out. Shipping tobacco then should not be taken down, until the arrival of some very warm dry and clear day, when the wind is at the south. If such a season should even take place in March, we may venture with safety; provided that the tobacco is in such order as scarely to prevent crumbling. Tobacco taken down in this order with such a season as above described, will do to prize any winter season afterwards. It will then be able to stand the most severe scrutiny and inspection, of our best Petersburg and Richmond buyers and shippers; all they will have to do is to give us prices agreeable to quality, and not to the "fancy colors"—about which, permit me to say one word or two.

I can well remember when the French people took a great fancy to particular colors of tobacco. It is really laughable to hear the names of the different colors by which it was then called; and the very great and unceasing industry taken by all and every tobacco-maker to excel each other. Some called it the "pie-bald color," some "calico," some "green streak," some "straw color," some "fawn color," and finally, the very best of all, some called it the "hickory leaf color." This was the *consummation* of all colors. In the year 1828, I took a fancy to the fawn color, and like many others, I thought I should get rich from making tobacco. We had writers then on the different colors. I cousulted all of them, and became more partial to the *fawn* color-writer. I had a lot of tobacco that year (say four acres, or fifteen thousand tobacco hills,) which had assumed before it was cut, all the variegated color of the most healthy and sprightly fawn. All of this tobacco came in nearly at one cutting. Agreeably to my essay on the *fawn* color, I cut this tobacco, carried it immedidiately to the best barn I had, regulated it on the sticks, by putting eight plants to the stick, then hoisted the sticks, giving them equal distance of eight inches. Then come the wood, the fire and my thermometer. However it may be unnecessary to name that several hours elapsed before I could begin with my fires, in consequence of having to teach my *attendant* the name of my heat measurer, and the number of degrees (eighty,) at which he was imperiously required to keep his fires going both day and night. I visited this barn during the firing process as strictly and as constantly, both day and night, as a doctor ever visited his patient with typhus fever. On the 16th day about the setting of the sun, my tobacco firer came and stated, that he believed the tobacco was cured, and that the fires ought to be stopped. I directed him to stop them, and bring to me my heat measurer. Upon examination of the tobacco, I found, I had a barn of as beautiful a *fawn* color as ever was seen; but the tobacco had no more *substance* in it, than an *oak leaf* in the month of March. I took great trouble with this tobacco in handling, stripping, squeezing, stretching, packing and prizing; and after all this, sold it in July 1829, in Richmond, for $4.20 per hundred! far less than I got for some "refused:" this broke me of paying so much *extra* attention to the management of tobacco, to the great neglect of the great grain crop. We should however bear in mind that all kinds of tobacco were selling comparatively low at this time, except for manufacturing.

In conclusion Mr. Editor, permit me to state that I have read with no ordinary interest in your valuable and ably edited Register, the several interesting and ingenious pieces on the cultivation and management of tobacco. However, they display no inconsiderable diversity of opinions. They remind me not a little of the five loo-players, who all *stood*, all played, and all got off. They all seem right in theory. To follow the strict directions of these tobacco-writers, is more than many are able to do for the want of the necessary funds to command the hands, and to build their barns, &c. and for them to carry out those theories to their greatest extent: I am pretty sure, many of us would make no corn, raise no hogs, and have no milk and sweet potatoes for our children. All, all (labor) for tobacco. Poverty and starvation would be the inevitable consequence, unless we could do by our tobacco, as Will Boniface of old did by his ale, "live upon it, sleep upon it." That the above writers have reflected much, devoted much time and labor in their several modes of making and managing the tobacco crop, I cannot for one mo-

ment entertain a doubt; and that they have realized ample reward for their industrious perseverance and assidiuty, I am equally disposed to believe. But at the same time, I presume these gentlemen are wealthy. They have the tobacco land. They have old experienced hands, calculated for little else than to attend to their barns, and the management of their tobacco. The hands are not put in the common stock of hands on the plantation, to assist in making any and every other product appertaining to a well regulated system of farming. These are advantages in managing tobacco, more than paramount to every other consideration. In this old state, I am decidedly of an opinion that the grain crop should not be neglected for that of tobacco. We should make as much grain as will be sufficient to support the demands of our plantations, and as much tobacco afterwards as possible. In my opinion this determination to make the grain, should be our memorable motto. More anon.

P. W. HARPER.

ON THE MANNER AND TIME OF EMPLOYING OVERSEERS.

Saratoga, (Buckingham,)
February 2d, 1836.

To the Editor of the Farmers' Register.

As I have just forwarded my subscription for the third volume of your Farmers' Register, and and not having heretofore given other evidence of the high estimation in which I in common with very many of my acquaintances in this part of the state hold that work, I will now indulge in a few remarks. Being a plain sailing farmer, I have not the disposition to attempt any labored criticism on the merits of the work, or the inclination to indulge in any inflated or ill-timed commendation. I dare say, it will be generally conceded, that, that person renders a more acceptable service, who when he beholds his fellow-man struggling against the difficulties which may surround him, freely contributes his mite to free him from embarrasments, than the individual who seeing the unpromising state of affairs, stands aloft either to detect and magnify blunders; or to cry huzza for those who so nobly combat for the amelioration of the human family, and the advancement of the great fundamental interest of the republic. Without farther preface, I will proceed to place before you, my reflections upon the important subject of having men of information and intelligence, as well as of practical skill to act as overseers—and also, on the expediency of the proprietors of estates entering into a general determination to change the time of employing, or making contracts with their overseers.

I think but few men of observation will deny, that one great cause of the very wretched state of agriculture in the middle section of Virginia, is owing to so large a portion of it being not only entrusted to men of limited acquirements and moderate capacities, but to those also whose interest it is, to aim almost exclusively at present gain, without regard to future consequences. We all know that it is the due combination of knowledge and practical skill, which enables particular individuals to achieve those objects calculated to better our condition; and, that requisitions are as frequently made on the arts and sciences in accomplishing agricultural improvements, as elsewhere. Notwithstanding this fact, and the circumstance of other avocations requiring long study and many years of apprenticeship before they are mastered; it is but too frequently the current belief, that all that is wanting in the farming department, to entitle any one to a decent standing, is to know how his father or grandfather used to manage their farms—and to be able to condemn indiscriminately all innovations on old practices, and stubbornly refuse to borrow light from other neighborhoods or communities.

It is also too prevalent a fashion among practical men to repudiate all agricultural knowledge derived from books, which is about as wise as the conduct of our farmers learned in the sciences, in eschewing the means of acquiring practical skill. The former throw aside books in accomplishing their agricultural operations, and the latter equally as sagaciously, attempt to be practical farmers solely by reading books, devising new theories, and figuring upon paper. It must be conceded however, that agricultural books in the hands of the really ignorant, are rather a disadvantage, for inasmuch as they only know the common rules practised by their forefathers, without having hardly examined the principles upon which they were based, or the particular circumstances which rendered them expedient; they can hardly be supposed capable of understanding the principles of any new subject connected with agriculture, or of possessing capacity sufficient to enable them to modify new rules or plans so as to suit their particular situation. For somewhat similar reasons, it follows, that purely theoretical men would be about as much benefited in having a farm to experiment upon. Then it seems, that the great desideratum necessary to ensure successful farming, is to possess so large a share of information and intelligence, as will enable any one to see what is going on around him, through a proper medium, and to determine,upon proper principles, the fitness and utility of things, while at the same time he has the practical skill successfully to turn the experience and plans of others to his own benefit, whenever in his judgement it may be advisable. Surely one of the highest points for any farmer to attain, is at all times to be able to grasp and wield the knowledge of others. We have frequently seen the immense difference between the judicious and injudicious application of both capital and labor even in the most common pursuits. While witnessing such occurrences, we cannot help being forcibly struck with the incomparable advantages, the well informed must possess over those who rely entirely upon their mother-wit. As for instance, in the case of the farmer who ploughs shallow, and then plants his corn with the rows running directly across his field—and up and down hills and ravines. The consequence is a bad crop, and the land also materially damaged by washing rains, and probably made so ridgy by improper cultivation, as to make it almost impossible to put the small grain in properly—and even after the small grain is removed, the land is apt in such cases to wash out where the middle of the corn rows were. So we find bad management in one case necessarily counteracting the next two or three efforts at good management, and preventing not only the fair returns from the

land, but leaving it exposed to injury for years. I heard it remarked once, by a farmer, that he considered the difference between selling a barrel o corn for $5, and purchasing one barrel at that price for the use of the plantation, was equal to $10 in the purse of the farmer. Upon this principle the difference between good and bad management is much greater than is generally believed.

If gentlemen had their funds rested in other property than land and negroes, they would be for getting clever and sensible men to manage and superintend them, but as long as their capital is in a farm &c., they seem to imagine that any dolt can see to feeding the cattle, working the ground, and whipping the negroes. And that it would be somewhat indecent for the proprietor to do any thing farther than pay taxes, pocket what little is made, and play the gentleman. This doctrine suits the taste of many individuals, and might be commendable were it not for the impoverishing effect it has on the purse, and the still greater injury it inflicts on the husbandry of the state. Agriculture, like other occupations, requires a willing and energetic hand to execute, and a sound and clear head to direct its various concerns, to render it either agreeable or profitable. The wish, very frequently, of getting overseers at low wages, induces many farmers to forego other considerations of vastly greater importance. What would be thought for instance of an undertaker of some public-building, who first having procured at great cost the best materials for constructing his work, would then run the risk, by employing an inferior mechanic for some $50 or $100 less than he could have engaged a good one for, of not only having an illy shaped, badly proportioned house put up, but also the hazard of spoiling or destroying all the fine materials that were prepared for the building? As injudicious, (to use the mildest term,) as such conduct would be, yet the farmers are frequently guilty of the like error. It needs no argument to prove how much injury such conduct has imposed on this state. If a man goes to the expense of getting a good farm, good slaves, good stock, &c., why surely he ought to be very particular in getting an overseer possessing all the requisites profitably to manage them. An error in that case not only prevents the annual proceeds from being what they should be, but the capital employed deteriorates, and blunders are made, which generally cost much labor and pains to counteract. In the general, we rarely if ever repent giving a good price for a good overseer, but frequently in our moments of repentance we would cheerfully have given three times the amount, rather than have had a bad manager. True economy therefore requires in this case, that we should look more to the overseer's ability to manage our matters profitably, than to the few extra dollars he may demand for his services. I hope I shall not be deemed an advocate of high wages, except as a contingent consideration. I have thought that a farmer who had property to the amount of $20,000 or $30,000 had better give a good manager two prices, or nearly that, for his services, than a bad one, half wages. That scientific or judicious agriculturists would in the main be decided gainers by pursuing the preceding suggestions, I see not the least good reason to doubt; and I think there is still less cause to suppose that the young or inexperienced farmer would be injured by doing *likewise*. To question the justness of the above remarks, would be tantamount, to maintaining, that a dull razor would shave as well as a sharp one, or that poor land would produce as much as rich.

But few subjects are more deserving of the consideration of the farmers and planters, than the present method of employing overseers. It is the general custom so far as my observation extends for overseers to be busily engaged in renewing their contracts with their old employers, or in hunting out new situations in the months of May, June, and July—some few only defering it till August.

The bad effects of this custom ought after a little reflection to be so apparent to all, as to create a general wish to produce a change. A gentleman employs a "new overseer," he takes place on the farm in November—makes a great effort to put his business forward—forces his teams and hands improperly—works the ground out of order and in the general does but little work in the way work ought to be done. As the spring approaches he must try and be the first to finish planting corn, seeding oats, making tobacco hills, planting his tobacco crop, &c., and for what? Why, if he is forward in the spring—has a great deal of work done—and dashes about to this and that place in a great hurry, he soon gets the credit of being a "tip-top" overseer, which is the consummation in his estimation most devoutly to be wished for. Frequently it happens the overseer makes preparation for two large a crop, which of course is injudicious, as well as is liable to be badly done, or in his great anxiety to be foremost, half prepares the proper quantity. However all this is not to him a matter of much moment. For he has probably a large family dependent upon his exertions, and his employer is independent, therefore he concludes it is proper for charity to commence at home, so he looks only to his own interest. Under this conviction he very naturally takes those steps that will tend the soonest to increase his wages. If the tests of merit rest upon an improper basis, why he says to himself "if the other overseers are weighed by them, and the employers think them sufficient, I too had just as well give into the fashion," therefore he exerts himself to acquire those characteristics deemed important. The time for contracting being at hand, the parties unfortnnately cannot agree about the terms for the ensuing year. Well! away goes the overseer on horse-back, in the most important part of the year, riding here and yonder in quest of a new home. In the mean time the employer and his business are all very unceremoniously left in the lurch, till the redoubtable character can procure a place. Some days and frequently weeks being passed off in this way, the overseer then returns to his post, and finds everything in confusion. Grass growing—crops suffering for work—and employer vexed. As one might expect the overseer finds there is more work to be done, than he can well have done. The crop soon begins to fail—some of the stock are killed up—the negroes badly treated—and at the end of the year, it turns out there has been much ado about nothing. The employer if young, quickly concludes farming a poor business, and if old, is apt to turn his overseer off—undergo

a great deal of fatigue, or get some lad to attend to his affairs in his stead.

This custom of making bargains with overseers in the months of May, June, and July, holds out as can be easily proven sundry inducements for rash and injudicious management in the commencement of the year, and but too frequently gives room for neglect, waste, and general bad management for the remainder of the year. It puts it in the power of indifferent managers to compete more successfully with the really good, in obtaining business. It has the tendency to induce people to form their estimates of the management of men, by their spring and winter's work mainly. It furnishes pretexts for neglect of business at the most important season of the year. It prevents the employer from forming a correct opinion of the qualifications of the overseer previously to renewing the contract for the second year, because that cannot well be determined till the crop is quite or nearly finished.

To obviate all these difficulties the planters and farmers need only come to a determination of not making contracts with their overseers except in the months of November and December; and of fixing the moving day between the 15th of December and the 1st of January.

Upon a little reflection it seems to me that most people will perceive the benefits that would result from this change. It would be one in my opinion not only eminently beneficial to the farmers, but to the good overseers also—for merit when ascertained is most sure to be rewarded. When we employ a man to do anything for us, we generally like to see how he executes before we give him additional work to do. Now this can only be done in this case by giving the overseers one year's trial, and then having ascertained their merits, we can with propriety continue or discontinue our contracts. By deferring the time of contracting, they will be induced to continue their exertions to give satisfaction and to gain reputation. And as the crop *made*, would be the test of their fitness, they would take more pains properly to prepare the ground, cultivate the crop, and to save it. The good managers would see that a display of skill and industry would be placed on its proper footing, and entitle them to higher consideration, and the bad managers for fear of not only being thrown in the rear, but of being left in the lurch, would also make greater exertions. The time could better be spared in November and December to look out business, than at any other time of the year. The overseers could then see all of their grain crops secured. The farmers could tell better what they could afford to give as wages, and the last of December would be the most suitable time for moving for various considerations, which it is not material to mention at this time.

I am sure if this plan were adopted we should have fewer overseers trifling about in the summer and fall, and fewer turned off. And as they would be stimulated to more industrious habits, we should have more good overseers, and the more good managers we have, the better for the country. This plan would obviate the necessity the farmers are under to a great extent at present of making the two first contracts with their overseers upon the recommendations of other men. It is nothing more than fair and proper that the farmers should not be forced to take an overseer but one year on trial—but according to the present custom, we are virtually forced in many instances to engage them for the two first years, before we have had an opportunity to judge of their qualifications.

In conclusion, it is proper to state, that it is not my intention to lay all the blame to the overseers, or because some are worthless, on that account, to disparage all of them. Like all other trades or professions, among them there are some that would do credit to any cause, while there are others of great inferiority. That there are many honorable, intelligent, and deserving men among them, as well as skilful farmers, I do not question or deny.

Whether or not these hints are worthy of public consideration, I leave it for others to determine. Certainly many expedients will have to be essayed, and great skill be required in working out the various means designed to resuscitate our husbandry. But that every effort may aid in achieving that great and desirable object, and hasten the period when this our native land shall again "blossom as the rose" must be the cardinal wish of us all.

EDMUND W. HUBARD.

From Burnett's Botany.

ON THE VALUE OF COUCH GRASS AS FORAGE.

[The English couch grass, is the same with the wire grass which is such a pest on the best sandy soils of Lower Virginia.]

Of the creeping species, the couch grass of the farmers, which is here regarded as a troublesome weed, is collected on the continent as food for horses. Cattle of all kinds are fond of the underground stems of this plant, which are sweet and wholesome. Sir Humphrey Davy found them to contain nearly three times as much nutritious matter as the stalks and leaves; and it has been stated, on the authority of a French veterinary surgeon, that exhausted and worn-out horses are very speedily restored to strength and condition by giving them, daily, one or two bundles of couch grass of ten or twelve pounds weight each, mixed with carrots.

From Burnett's Botany.

EUROPEAN OPINIONS OF DARNEL OR SPELT.

[The plant which is commonly called spelt in Virginia, and which is believed by many farmers to be produced by the degeneracy of wheat, is the *lolium temulentum*, or darnel, described below. In a former article on this grass, (p. 325, Vol. II.) we expressed surprise at the apparent fact that this grass, which was so great, and still a growing pest, among wheat in Lower Virginia, should not be much complained of in England, where it had been known from time immemorial. This is explained in the following piece; as it seems that a much warmer climate than that of England, is necessary to give darnel that vigor which it unfortunately has here.]

land, but leaving it exposed to injury for years. I heard it remarked once, by a farmer, that he considered the difference between selling a barrel o corn for $5, and purchasing one barrel at that price for the use of the plantation, was equal to $10 in the purse of the farmer. Upon this principle the difference between good and bad management is much greater than is generally believed.

If gentlemen had their funds rested in other property than land and negroes, they would be for getting clever and sensible men to manage and superintend them, but as long as their capital is in a farm &c., they seem to imagine that any dolt can see to feeding the cattle, working the ground, and whipping the negroes. And that it would be somewhat indecent for the proprietor to do any thing farther than pay taxes, pocket what little is made, and play the gentleman. This doctrine suits the taste of many individuals, and might be commendable were it not for the impoverishing effect it has on the purse, and the still greater injury it inflicts on the husbandry of the state. Agriculture, like other occupations, requires a willing and energetic hand to execute, and a sound and clear head to direct its various concerns, to render it either agreeable or profitable. The wish, very frequently, of getting overseers at low wages, induces many farmers to forego other considerations of vastly greater importance. What would be thought for instance of an undertaker of some public-building, who first having procured at great cost the best materials for constructing his work, would then run the risk, by employing an inferior mechanic for some $50 or $100 less than he could have engaged a good one for, of not only having an illy shaped, badly proportioned house put up, but also the hazard of spoiling or destroying all the fine materials that were prepared for the building? As injudicious, (to use the mildest term,) as such conduct would be, yet the farmers are frequently guilty of the like error. It needs no argument to prove how much injury such conduct has imposed on this state. If a man goes to the expense of getting a good farm, good slaves, good stock, &c., why surely he ought to be very particular in getting an overseer possessing all the requisites profitably to manage them. An error in that case not only prevents the annual proceeds from being what they should be, but the capital employed deteriorates, and blunders are made, which generally cost much labor and pains to counteract. In the general, we rarely if ever repent giving a good price for a good overseer, but frequently in our moments of repentance we would cheerfully have given three times the amount, rather than have had a bad manager. True economy therefore requires in this case, that we should look more to the overseer's ability to manage our matters profitably, than to the few extra dollars he may demand for his services. I hope I shall not be deemed an advocate of high wages, except as a contingent consideration. I have thought that a farmer who had property to the amount of $20,000 or $30,000 had better give a good manager two prices, or nearly that, for his services, than a bad one, half wages. That scientific or judicious agriculturists would in the main be decided gainers by pursuing the preceding suggestions, I see not the least good reason to doubt; and I think there is still less cause to suppose that the young or inexperienced farmer would be injured by doing *likewise*. To question the justness of the above remarks, would be tantamount, to maintaining, that a dull razor would shave as well as a sharp one, or that poor land would produce as much as rich.

But few subjects are more deserving of the consideration of the farmers and planters, than the present method of employing overseers. It is the general custom so far as my observation extends for overseers to be busily engaged in renewing their contracts with their old employers, or in hunting out new situations in the months of May, June, and July—some few only defering it till August.

The bad effects of this custom ought after a little reflection to be so apparent to all, as to create a general wish to produce a change. A gentleman employs a "new overseer," he takes place on the farm in November—makes a great effort to put his business forward—forces his teams and hands improperly—works the ground out of order and in the general does but little work in the way work ought to be done. As the spring approaches he must try and be the first to finish planting corn, seeding oats, making tobacco hills, planting his tobacco crop, &c., and for what? Why, if he is forward in the spring—has a great deal of work done—and dashes about to this and that place in a great hurry, he soon gets the credit of being a "tip-top" overseer, which is the consummation in his estimation most devoutly to be wished for. Frequently it happens the overseer makes preparation for two large a crop, which of course is injudicious, as well as is liable to be badly done, or in his great anxiety to be foremost, half prepares the proper quantity. However all this is not to him a matter of much moment. For he has probably a large family dependent upon his exertions, and his employer is independent, therefore he concludes it is proper for charity to commence at home, so he looks only to his own interest. Under this conviction he very naturally takes those steps that will tend the soonest to increase his wages. If the tests of merit rest upon an improper basis, why he says to himself "if the other overseers are weighed by them, and the employers think them sufficient, I too had just as well give into the fashion," therefore he exerts himself to acquire those characteristics deemed important. The time for contracting being at hand, the parties unfortnnately cannot agree about the terms for the ensuing year. Well! away goes the overseer on horse-back, in the most important part of the year, riding here and yonder in quest of a new home. In the mean time the employer and his business are all very unceremoniously left in the lurch, till the redoubtable character can procure a place. Some days and frequently weeks being passed off in this way, the overseer then returns to his post, and finds everything in confusion. Grass growing—crops suffering for work—and employer vexed. As one might expect the overseer finds there is more work to be done, than he can well have done. The crop soon begins to fail—some of the stock are killed up—the negroes badly treated—and at the end of the year, it turns out there has been much ado about nothing. The employer if young, quickly concludes farming a poor business, and if old, is apt to turn his overseer off—undergo

a great deal of fatigue, or get some lad to attend to his affairs in his stead.

This custom of making bargains with overseers in the months of May, June, and July, holds out as can be easily proven sundry inducements for rash and injudicious management in the commencement of the year, and but too frequently gives room for neglect, waste, and general bad management for the remainder of the year. It puts it in the power of indifferent managers to compete more successfully with the really good, in obtaining business. It has the tendency to induce people to form their estimates of the management of men, by their spring and winter's work mainly. It furnishes pretexts for neglect of business at the most important season of the year. It prevents the employer from forming a correct opinion of the qualifications of the overseer previously to renewing the contract for the second year, because that cannot well be determined till the crop is quite or nearly finished.

To obviate all these difficulties the planters and farmers need only come to a determination of not making contracts with their overseers except in the months of November and December; and of fixing the moving day between the 15th of December and the 1st of January.

Upon a little reflection it seems to me that most people will perceive the benefits that would result from this change. It would be one in my opinion not only eminently beneficial to the farmers, but to the good overseers also—for merit when ascertained is most sure to be rewarded. When we employ a man to do anything for us, we generally like to see how he executes before we give him additional work to do. Now this can only be done in this case by giving the overseers one year's trial, and then having ascertained their merits, we can with propriety continue or discontinue our contracts. By deferring the time of contracting, they will be induced to continue their exertions to give satisfaction and to gain reputation. And as the crop *made*, would be the test of their fitness, they would take more pains properly to prepare the ground, cultivate the crop, and to save it. The good managers would see that a display of skill and industry would be placed on its proper footing, and entitle them to higher consideration, and the bad managers for fear of not only being thrown in the rear, but of being left in the lurch, would also make greater exertions. The time could better be spared in November and December to look out business, than at any other time of the year. The overseers could then see all of their grain crops secured. The farmers could tell better what they could afford to give as wages, and the last of December would be the most suitable time for moving for various considerations, which it is not material to mention at this time.

I am sure if this plan were adopted we should have fewer overseers trifling about in the summer and fall, and fewer turned off. And as they would be stimulated to more industrious habits, we should have more good overseers, and the more good managers we have, the better for the country. This plan would obviate the necessity the farmers are under to a great extent at present of making the two first contracts with their overseers upon the recommendations of other men. It is nothing more than fair and proper that the farmers should not be forced to take an overseer but one year on trial—but according to the present custom, we are virtually forced in many instances to engage them for the two first years, before we have had an opportunity to judge of their qualifications.

In conclusion, it is proper to state, that it is not my intention to lay all the blame to the overseers, or because some are worthless, on that account, to disparage all of them. Like all other trades or professions, among them there are some that would do credit to any cause, while there are others of great inferiority. That there are many honorable, intelligent, and deserving men among them, as well as skilful farmers, I do not question or deny.

Whether or not these hints are worthy of public consideration, I leave it for others to determine. Certainly many expedients will have to be essayed, and great skill be required in working out the various means designed to resuscitate our husbandry. But that every effort may aid in achieving that great and desirable object, and hasten the period when this our native land shall again "blossom as the rose" must be the cardinal wish of us all.

EDMUND W. HUBARD.

From Burnett's Botany.

ON THE VALUE OF COUCH GRASS AS FORAGE.

[The English couch grass, is the same with the wire grass which is such a pest on the best sandy soils of Lower Virginia.]

Of the creeping species, the couch grass of the farmers, which is here regarded as a troublesome weed, is collected on the continent as food for horses. Cattle of all kinds are fond of the underground stems of this plant, which are sweet and wholesome. Sir Humphrey Davy found them to contain nearly three times as much nutritious matter as the stalks and leaves; and it has been stated, on the authority of a French veterinary surgeon, that exhausted and worn-out horses are very speedily restored to strength and condition by giving them, daily, one or two bundles of couch grass of ten or twelve pounds weight each, mixed with carrots.

From Burnett's Botany.

EUROPEAN OPINIONS OF DARNEL OR SPELT.

[The plant which is commonly called spelt in Virginia, and which is believed by many farmers to be produced by the degeneracy of wheat, is the *lolium temulentum*, or darnel, described below. In a former article on this grass, (p. 325, Vol. II.) we expressed surprise at the apparent fact that this grass, which was so great, and still a growing pest, among wheat in Lower Virginia, should not be much complained of in England, where it had been known from time immemorial. This is explained in the following piece; as it seems that a much warmer climate than that of England, is necessary to give darnel that vigor which it unfortunately has here.]

Lolium perenne, or ray-grass, is one of our best, and lolium temulentum one of our worst grasses. Luckily, the latter is only an annual; appearing chiefly among wheat, and then known by the name of darnel. This is generally supposed to be the "infelix lolium" of Virgil, of which he speaks in no measured terms of condemnation. It is not a very common grass in Britain, where farmers are particular in the choice of their seed, but in warmer climates it is a noxious corn-weed, and, with the barren oat, overtops and chokes the wheat, so that Milne thinks it highly probable that the Greek *zizania*, which occurs in the thirteenth chapter of St. Matthew's Gospel, should be rendered *darnel*, which would convey the meaning of the passage more fully than *tares*, and, in accordance with this view, the French always translate it *ivraie*, from *ivre*, drunk. Our partiality for contractions has caused the corruption of the French ivraie into *ray*-grass, one of the names of darnel, although it properly applies to one species only, viz., the lolium temulentum, which is said to possess intoxicating powers. Haller affirms that this species of lolium not only produces intoxication, as its trivial name implies, but that, if baked into bread, or fermented in ale, its administration is attended by very disagreeable, and even fatal effects. It produces headache, vertigo, vomiting, lethargy, drunkenness, and difficulty of speech, and the tongue exhibits a very strong trembling. Seagar further remarks, that a trembling of the body is one of the most certain signs of poisoning by this plant. It also affects with blindness for several hours.

By the Chinese laws—for this plant is found both in China and Japan—it is forbidden to be used in fermented liquors. Some of the intoxicating qualities of factitious beer are said to be owing to the admixture of darnel with the malted barley; and a few years ago, two acres of ground in Battersea-fields were sown with this grain: to what good purpose it could have been applied is unknown, for, though darnel meal was once recommended as a sedative cataplasm, it has long been disused; and, according to Withering, horses, geese, &c., are killed by darnel, and dogs are peculiarly subject to its influence; mixed in small quantities with their food, it is, however, said to fatten chickens and hogs.

In the "Medical and Physical Journal" there are placed on record several cases of poisoning, by darnel, in the human subject. In these, giddiness of the head, pain, and swelling of the limbs, succeeded by abscess and gangrene, were the most prominent symptoms. One of the sufferers lost both his legs. Various othes cases, exemplifying the poisonous properties of this grain, have been condensed in the chapter on this plant, in the new edition of "Medical Botany." This, the only poisonous grass known, is easily distinguished by its two sided spike, and one-valved glume; the glumes being longer than the bearded locustæ they enclose.

ENGLISH OPINIONS OF AN AMERICAN AGRICULTURAL WORK.

At page 511 of this volume, we commented at some length on the *manner* in which the conductor of the British Farmer's' Magazine, that thought fit to re-publish in that work a garbled and imperfect edition of the *Essay on Calcareous Manures*. Since that time, two more of the numbers have been received, in which the re-publication is continued, liable to all the objections first stated. We have not read through the extracts, nor indeed any entire page of them, for the purpose of comparison—but to a general view, it appears that the first edition is re-published entire, with the exception formerly named, that a single short chapter ("on the soils and state of agriculture in the tide-water district of Virginia") is omitted, and also the preface—and these, if not omitted, would have served to show to the English reader the true source, and proper object, of the essay, and would have prevented much of the awkwardness, and apparent presumption, displayed by its appearing (falsely) as an "original communication" in an English periodical; and as if addressed to a class of readers, whom in truth, its anthor had not expected to reach. If a single sentence of proper explanation from the conductor of the journal for which it was thus *borrowed*, had been prefixed, intelligent European agriculturists, and men of science, might perhaps have been invited to examine the work, if by no other inducement than the novelty of transatlantic views on soils and agricultural features altogether unknown in England, and altogether different. But to suppose an unknown American writer to be addressing English agriculturists, through the pages of an English journal, (as would be inferred by every reader of the re-publication,) would mark him as both conceited and presumptuous. We venture to assert, that the views presented in the essay, if fairly considered, will be found no less novel in England than in Virginia. Still, the practical use of calcareous manures there has been long established, and many volumes present instructions for their application, and reasoning, voluminous, if not sound, respecting their operation and value; and every intelligent reader can well conceive that a writer, if addressing English readers, would have adopted a very different form to convey his opposing opinions, from what would be proper in this country, where circumstances and opinions were altogether different, and the practice scarcely existed. But however much reason we may have to complain of the conductor of the Farmer's' Magazine having thus appropriated and disguised our work, and the unseemly and dubious shape in which he has presented it to the British public, we freely admit our gratification that, even in this way, it has been thus extended: and still more that it has been the means of attracting the attention, and eliciting the remarks, of the writer whose incidental review of the portion of the essay which had then appeared, is copied below from the same journal. The reviewer had then seen only as much of the theoretical part, as treated of the first propositions: the continuation of his remarks, which he promises, will be also re-published here, when received. Mr. Towers is the author of the "Domestic Gardener's Manual," and of many articles in different British periodicals, on scientific horticulture, and agricultural chemistry.*

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* One of his pieces, "On the excretary powers of plants" was insert d at page 157, Vol. II. Farme·s' Register—in which, and seemingly on good ground, he asserted an equal claim to this discovery, the honor of which has been awarded to Macaire. Ed.

Perhaps an apology may be deemed necessary for our inserting so laudatory a review of a work of our own. There are few subjects more suitable to be selected for an agricultural journal, than the exhibition of the opinions of intelligent judges in foreign countries, of the writings and opinions of our own farmers: and this consideration would direct the re-publication of any such review, no matter of what American work on agriculture, or whether the reviewer might have awarded more of approbation or censure. Our individual connexion with the work in question, would not justify a departure from this general editorial obligation: and if the opinions expressed in the continuation of this reviewer on the part of the work which he had not then seen, or of any other intelligent foreigner, should be altogether condemnatory, they will notwithstanding, be here re-published, as surely and as readily. Sundry highly approbatory American notices, and some extended reviews, of the second edition of the *Essay on Calcareous Manures*, have been published in this country—but not one of them has been copied into this journal: because, as these publications had appeared in popular and valuable journals, and were already before a large portion of the American public, it was not necessary, and would have perhaps been indelicate for us to extend their circulation, by re-publication in the Farmers' Register. Yet each of these reviews was fully as favorable as that of Mr. Towers': and among the writers, we will name Jesse Buel, and David Thomas, (whose reviews appeared severally in the Cultivator, and the Genesee Farmer,) whose good opinion and applause deserved to be valued as highly as those of any living agriculturists whatever.

Before commencing the following piece, we will point to some things which particularly deserve attention. The writer asserts in the strongest manner the almost universal presence of calcareous earth, (carbonate of lime) in the soils of England—a fact which was inferred from indirect evidence, and on that ground asserted in the Essay on Calcareous Manures. Another circumstance worthy of note, is, that Mr. Towers is one of those chemists who deny the existence of humic, or geic acid; and has opposed, in a long article in the Quarterly Journal of Agriculture, the recent alleged discovery of that substance. Yet he does not here deny, and seems by implication to admit, the doctrine of acid soils, as maintained in the first edition of the Essay, when it had no support from the discovery of humic acid, as the account of that discovery had not then reached this country.

From the British Farmer's Magazine.

ON THE UTILITY OF CHEMISTRY TO AGRICULTURE AND HORTICULTURE.

By Mr. Towers, author of the "Domestic Gardener's Manual," C. M. H. S.

I do not affect to apologize for the introduction of this subject, at some length, into your pages, because I conceive that, however it may have occupied the attention of practical farmers, upon the urgent recommendation of men and science, it has been misunderstood, and, therefore, unjustly agitated.

I have been induced to resume the consideration, by the perusal of those admirable papers in your two last numbers, entitled *Essay on Calcareous Manures*—by Mr. Ruffin—papers which, I think, contain the soundest truths, and, therefore, may be rendered more practically available than most of the elaborate works that have preceded them. The propositions of the writer require, however, to be impartially examined; but before I attempt to do so, I shall cite a passage from a chemical work, written by that worthy and zealous man, the late Mr. Samuel Parkes, whereby the reader may, at one view, appreciate the object of the chemist, and the weight of the arguments he employs, when he urges the necessity to call his science in aid of the agriculturist.

"Chemistry" (it is observed) "will teach him" (an opulent land-owner) "how to improve the *cultivated* parts of his estate; and by transporting and transposing the different soils, he will soon learn some method by which each of his fields may be rendered more productive.

"The analysis of soils will be followed by that of the waters which rise upon, or flow through them; by which means he will discover those proper for irrigation, a practice, the value of which is sufficiently known to every good agriculturist.

"Should he himself occupy the farm, and become cultivator of his own estate, he must, of necessity, be a chemist, before he can make the most of his land, or put it in a high state of cultivation, at the smallest possible expense. It will be his concern, not only to analyze the soils on the different parts of his farm, but the peat, the marl, the lime, and the other manures, must be subjected to experiment, before he can avail himself of the advantages which they possess, or before he can be certain of producing any particular effect by their means. The necessity of analysis to the farmer is evident from a knowledge of the circumstance, that some kind of lime" *(magnesian limestone)* "is really injurious, and would render land which had been hitherto very productive, actually steril."—(*Chemical Essays*, vol. i. pp. 8, 9,)—Again:

"A knowledge of the first principles of chemistry will teach him when to use lime *hot* from the kiln, and when *slacked;* how to promote the putrefactive process in his composts, and at what period to check it, so as to prevent the fertilizing particles bscoming effete, and of little value.

"It will teach him the difference in the properties of marl, lime, peat, wood ashes, alkaline salt, soap waste, sea water, &c., and, consequently, which to prefer in all varieties of soil. A knowledge of the chemical properties of bodies will thus give a new character to the agriculturist, and render his employment rational and respectable."—(*Idem.*, pp. 10, 11.) And in a note—

"Lavoisier cultivated 240 acres of land in La Vendée, on chemical principles, in order to set a good example to the farmers; and his mode of culture was attended with so much success, that he obtained a third more of crop than was procured by the usual method, and in nine years his

annual produce was doubled.—From *Lalande's Life of Lavoisier.*

Thus far the pretentions of the chemist are made out; his objects are defined, and it must be admitted that with the exception of one or two points, which, not to be hypercritical, we may safely pass by, science has laid no claim that she cannot establish. Chemists *can* analyze soils, *can* determine the quality and quantity of their component parts, *can* detect acids if such exist, and point out antagonist principles by which they may be rendered neutral, and, to a certain extent, innoxious: thus far, then, the chemist and his science must be useful to the agriculturist; nothing but the most dense prejudice can oppose this admission; and were every farmer to become an analytic chemist, to the extent above referred to, and be able to detect the components of his soils and manures, his mind would be enlarged, his sources of rational pleasure and amusements increased, and his practice removed further from that of the empiric, in proportion as it became based upon philosophic truth.

In a former paper (No. xxxiv., p. 537,) I have endeavored to elucidate the science and operations of analysis: I now find a powerful coadjutor in Mr. Ruffin; and am satisfied that, his remarks and observations under that head of his essay, entitled "*Results of the chemical examination of various soils,*" and the processes therein described, are some of the most luminous which I have ever met with. The perspicuity of his description clearly demonstrates that he was familiar with his subject, and the young agricultural chemist may safely follow his steps, and rely upon the general accuracy of his deductions.

Having thus upheld the cause of chemistry I must advert to those points wherein I consider it has less claim to confidence; and these may be shortly exhibited, so as not to burden the subject unnecessarily.

The operations of chemistry have a legitimate object when they are performed upon what is considered dead or inert matter; thus, there is no material substance throughout the range of created things, which, provided it be not endowed with the *vital principle*, may not justly be submitted to the test of chemical agents. It is now admitted by our best philosophers, that chemical action is entirely dependent upon, and identical with, electrical energy; that, in fact, the combination of all substances, and their decomposition, are maintained and effected by electrical affinities. As electricity is the most influential of the great natural agents; being an immediate emanation (I use this word for want of a better term,) from the source of light, the sun, whose rays have been poured upon the world from the commencement of time; and as chemical action is but a manifestation of electric energy, it follows, that every individual thing which can be dissolved, decomposed, or in any way disturbed, so as to cause a change in the arrangement of its constituents, is imbued with with the essence of light. Chemistry, therefore—to say the least of it—is one of the grandest and most comprehensive sciences which the human mind can employ in its researches after truth.

But the vital principle, though it may be, and probably is, connected with electrical action, is not a legitimate subject of chemical experiment; and those chemists have erred who have attempted to discover its nature by chemical agency. *That which destroys life*, or interferes with the vital functions, can neither tend to elucidate the nature of the one, nor discover the causes of the other. The principle of life, whether it be that of animals or of vegetables, appears to be directly antagonist to chemical energy; no one, therefore, can be justified in attempting to interpret any of the phenomena of vegetable life, by the application of chemical principles. Chemists, then, it appears to me, have weakened their own cause by endeavoring to prove too much: we know nothing of life, we consequently cannot interpret its phenomena, or refer them to those agencies which are called into action by its extinction.

Scientific men have also laid themselves open to reproof, or even reproach, by their speculative reasonings upon the practical operations of the farmer. In the laboratory the chemist moves in his own appropriate sphere; there he can, and ought to, investigate the substances which nature has rendered the matrix of her vegetable productions; and thence, he may diffuse, in every direction, a knowledge of the facts which his genius and experimental acumen have enabled him to elicit; but he has no right to criticise the practice of the agriculturist in respect to the management of his crops. Abstract reasoning, from deductions drawn from the most refined experiments upon dead matter, can never authorize any interference with the well-grounded practice of the cultivator—of an organized being endowed with the mysterious principle of life. Even in that modern and comprehensive doctrine of the *radical exudation by plants*, which bears directly upon the *rotation of crops*, and interprets its philosophy, the experiments which have detected exuded matters by the test of re-agents, ought to be regarded with suspicious caution, inasmuch as they have, one and all, been performed upon plants placed in unnatural situations, and acted upon by some medium altogether different from that of the soil, in which alone they could flourish, and perfectly develope their foliage and fruit.

It is the duty of the chemist to lay down clear and definite rules, by which soils and manures may be correctly analysed; and if, with an intimate knowledge of practical and theoretic science, he can combine a knowledge also of farming, attained by actual experience—as was in fact exemplified in the person by the renowned Lavoisier, and now by the writings of Mr. Ruffin—he is preeminently qualified to instruct, and to recommend his principles by the force of example. But in ordinary cases, men of the highest attainments in experimental science cannot command time, or the means, to become extensive cultivators: hence it would always be wise to point out those facts which cannot be controverted, and to let the practical man avail himself of the aids thus furnished, in any way which his good sense may direct. If the farmer be so unconcerned or prejudiced, as to overlook or reject those important instruments of research which are offered to his notice, the blame must rest with himself. Farming is, at the present moment, in a state that demands all the resources which science can furnish. The prices of every product of the farm are reduced to a very alarming extent: but the reduction, though great, bears no comparison with that of almost all the

preparations of the manufacturing chemist. Yet the extension of his science has enabled him to bear up with a bold front against a depreciation of two, three, perhaps four hundred per cent.; and now to produce, with a remunerating profit, chemicals of a quality far superior to those which his predecessors sold at an enormously high price. Farmers, therefore, while they feel and admit the necessity to adopt every economical measure to insure increased produce, ought to regard the chemist and his art with reverential deference. Even the simple perusal—by a man of discernment—of the "*Electrical Researches*" of the amiable and accomplished Faraday, is amply sufficient to prove, beyond a doubt, the scientific chemist to be a person of superior order; one to whom the revealment of the wonder-working secrets of nature is intrusted; and his art, the grandest, the most sublime treasure that could be conferred on any created being. That science, legitimately directed, is well qualified to assist the farmer, and promote his welfare, for it bears directly upon the agents which he employs in the culture of every one of his crops.

One other objection to the general utility of chemistry to agriculture remains to be notieed before I pass to the investigation of Mr. Ruffin's propositions, namely:—it is asserted and freely admitted, that the nature of soils lies open to the investigations of the chemist; but it may too frequently occur, that although experiment can readily detect the components of a soil, point out an antidote for any deleterious substance which may be traced therein, and show that in which it may be deficient, the substance required, either to correct the evil or supply the deficiency, may not be at hand. Thus, a soil may superabound in sand, or exhibit a poisonous salt of iron; but alumen or pure lime may be unattainable, unless at an outlay which would neutralize the benefit to be derived from the use of either. Fortunately, however, science can go a considerable way towards procuring an artificial remedy, and thus tend to supply the deficiency of the natural one; but as I must recur to this subject hereafter, I shall not dwell upon it now.

It is somewhat unfortunate that the "*Essay on Calcareous Manures*" was written expressly for America. Mr. Ruffin, it is true, makes frequent allusions to the theories and experiments of British chemists; but his own observations and analyses apply purely to the soils of the United States—to that part at least of which he observes, "no chalk is to be found in our country, and it is only from European authors that we can know anything of its agricultural characters, when nearly pure, or when forming a very large proportion of the surface of the land."

Mr. Ruffin's arrangement, however, of the three principal earths, is clear, precise, and correct; as is also his general conclusion at the end of the before mentioned page, viz.—"the mixture of the three earths, in due proportions, will correct the defects of all; and with a sufficiency of animal or vegetable matter, putrescent, and soluble in water, a soil is formed in which plants can extend their roots freely," &c. &c.

But he, perhaps, labors under an error in supposing that all the earths, when pure, "are entirely barren; or that *chalk*, alone, could give them the fertilizing principle." The only soil which I have ever met with, that has appeared to be wholly destitute of calcareous matter, (or, at least, that which affords no trace of it to the muriatic acid test,) is a black bog peat; but in this soil, a few plants will grow with extreme verdure. It does not appear to me that the absence of calcareous earth is the sole cause of the general sterility of turbary soils: I refer it to the situation in which they are originally produced, and in this point, a remark made by Mr. Hayward will apply very pertinently. In the paper on the *Food of Plants*, which precedes *the Essay*, and in the middle of page 197, it is observed: "if a quantity of the leaves of trees be collected, and immersed in a cistern or pool of stagnant water, and permitted to remain undisturbed for three years, they will be decomposed, and in appearance will be in that state which, placed on the surface of the earth, should form a fertilizing substance; yet it will be found so steril, that no plant will grow in it."

Now the true peat mosses are formed, in the large way, in a manner analogous to the earth of decayed, immersed leaves, above described; that is, a bulk of vegetable matters is burried, and becomes sndden under water. Now leaves, and, indeed, vegetable substances in general, if burnt, yield a great abundance of *carbonate ef lime*, as indeed, Mr. Ruffin asserts: therefore, though it may be presumed that, while in a growing state, these substances contain no *chalk*, properly considered as such, yet the elements of that earth must exist in them, otherwise it could not be revealed by the action of fire. Inert vegetable soils then, may originate in the peculiar action of water upon them, while they are deposited in a situation from which atmosperic air is excluded. This, too, accords with Mr. Hayward's idea, and it appears to be well founded. One of the most energetic loams which I have ever tested, contains merely a hint of *carbonate of lime;* it is of a fine, ochrous color, a velvety, unctuous texture, and when washed by various effusions of water, yields nearly three-fourths of its bulk of impalpable matters, the remainder being a moderately fine silicious sand. When muriatic acid is applied to the fine matters, it produces little effervescence, and detects scarcely two per cent. of chalk. This loam is applicable to almost every species of plants; far more so than many earths which contain three times the proportiou of chalk named, with double the quantity of warm sand. But if calcareous matter be the principal meliorating medium, the quantity required must be small indeed, if that in the loam just alluded to be sufficient to establish the fertilizing principle.*

* This soil, containing "scarcely two per cent. of chalk," is abundantly calcareous to have acquired, and to retain all its fertility, according to the theory maintained in the Essay on Calcareous Manures. Any quantity, however minute, of *carbonate* of lime found naturally existing in a soil, proves that there had been enough for its use and benefit. The author of the Essay was far from maintaining that the proportion of *carbonate* of lime found in any soil, was the measure of its fertility. The quantity originally given to soils, by natural causes, when not excessive, and under like circumstances, might have served to measure the pow-

The first proposition of the Essay refers chiefly to the hypothesis that, "soils naturally poor, cannot be permanently enriched;" and, "that the labors of man have been but of little avail in altering the characters and qualities given to soils by nature."

In as far as this view extends, I heartily assent to the opinion of the essayist, and upon the ground which I, for some time, have assumed—that, "soils, be their nature what it may, tend to reduce manuring substances to earths of their own precise quality;" and, in accordance with this doctrine, I hold it highly probable that the ultimate end of manuring is to support and maintain the quality and bulk of the staple soil.

Earth may be gorged with manure, but it is not thereby enriched. Plants may be rendered richly luxuriant in a gorged soil, but their health and vigor are not thereby increased. A medium state of soil, wherein it contains a proper quantity of enriching decomposable matters, is most favorable to healthy and robust vegetation; and in it those matters soon disappear, and nothing but earth remains after a few crops have exerted their energies upon the soil. Any one who has witnessed the effects of sand upon a very liberal supply of manure, after a crop has been taken, will not be at a loss to determine what the terms "barren" and "hungry" mean, when applied to land. Strong loams, on the contrary, hold the manures unchanged for a considerable time when not cropped, and retain the active principle more tenaciously by far than light sands, even when severely cropped. Now it is certain that, every correct analysis has proved the convertibility of farm-yard manures into, not only the elements of vegetables, but also into the three staple earths themselves: if, then, a hungry sand, after a liberal system of manuring for years, still return to its original state of poverty, what must have become of the *alumen*, the *carbonate of lime*, and the *oxide of iron*, which the manuring substances were capable of yielding under certain conditions, to say nothing of the oxygen, the hydrogen, the carbon, and the azote, all of which gaseous products may be presumed to have been taken up by vegetable, vital action.

Every fact that I am aware of, seems to prove—first, that vegetable action tends to decompose manuring substances within the soil: secondly, that these substances are either wholly consumed, or deposite a residuum which is precisely similar in character to that of the natural earth, leaving it, whether it be sandy, clayey, or loamy, neither more nor less rich than it was in its original constitution. If this view of the results of manuring be correct, then Mr. Ruffin's first proposition is so far, to all intents and purposes, established.

The second proposition of the Essay unfortunately refers almost exclusively to the soils of Virginia, but one point of it, which is of great interest, is contained in the following lines—"The abundance of *putrescent vegetable matter* might well be considered the cause of fertility, by one who judged only from lands long under cultivation."—"Vegetable matter abounds in all rich land, it is admitted; but it has also been furnished by nature, in quantities exceeding all computation, to the most barren soils we own." The author then proceeds to state that, calcareous earth—by which term he always intends to express *chalk*, i. e. *carbonate of lime*—is "the cause of fertility, and the cure for barrenness."

The arguments are well sustained throughout the remaining part of the Essay, and prove the value and importance of chemical knowledge: they are, however, far too extensive to permit of being minutely investigated, and, indeed, may not be generally applicable to the soils of England. However, it would be highly desirable that particular attention be given to the facts adduced, in all districts where peat mosses exist, or have been recently reclaimed, for therein vegetable remains abound; and though these substances contain the elements of calcareous earth, they also are replete with those of vegetable acids, inasmuch as they are chiefly composed of oxygen, hydrogen and carbon—the bases of all such acids. The presence of acids need not therefore be questioned, though they may not be traceable as such, being taken up and neutralized by the chalk, or alkalescent matters with which they come in contact as soon as they are produced.

The sterility of pure peaty soils, and their incapability of improvement by manuring substances, tend much to strengthen the second proposition, as does the fact, that paring and burning are found experimentally to be meliorating processes of great efficiency; and why? simply, because the agency of fire decomposes the vegetable matters, destroys the acidifying elements, or, to speak more corectly, disperses them in the form of gases, or aqueous vapor, liberates and fixes the carbonate of lime, and a portion of free carbon, and perhaps, (generally,) a little carbonate of potassa also. Here, then, we perceive another proof of the importance of chemical science, for nothing else could ascertain the results of the combustion of the peat, or refer them to their proper causes.

Mr. Ruffin's observations prove the correctness and accuracy of his analysis and conclusions. *All wood ashes*, as I have proved by reiterated experiments, and asserted, *do* contain *carbonate of lime*, and some other neutral and alkaline salts; but whether these saline compounds have been furnished "by the soil on which the plants grew," as he supposes, is to me a matter of some doubt. The *roots* are the media which connect the plant with the earth, and the *leaves* expose it to the influence of light and air: of these facts there can be no doubt; but several experiments with the sap of a bleeding vine, have led me to hesitate on the subject of the components of that fluid. I have not been able, as yet, to detect the presence of carbonic acid in it, but future experiments may furnish more decisive evidence than any which have, as yet, come under my observation; still,

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er to acquire and fix fertility. But in the course of reaching that end, the lime is supposed, by combining with vegetable acid, to cease to be the carbonate, and is no longer detected in that form. This soil which Mr. Towers scarcely considers calcareous—or as containing "*merely a hint* of carbonate of time," is in fact better supplied with that ingredient than almost any natural soil in our Atlantic States—not even excepting our limestone soils. Indeed, the only soils more calcareous, are the few and very limited spots on which shells have been deposited.—Ed. Farm. Reg.

however, I lean to the opinion that, it is by no means from the soil alone that plants derive their specific juices. When we perceive that *aërolites*, containing metallic compounds of a peculiar nature, are formed in the atmosphere; that masses of hundreds of pounds in weight are precipitated from the air to the earth—(admitting the records of these startling phenomena to be founded in fact)—we need scarcely doubt the possibility of the convertion of the elements of water alone into all the specific secretions of plants, through the agency of light and air.

But, be this as it may, the theory of the neutralization of vegetable acids by the carbonate of lime, naturally existing in the soil, is at once bold, novel, and extremely plausible. The whole tissue of arguments adduced, are very ingenious and philosophical; and though they do not apply with equal force to the soils of Britain, are highly important to the philosophical agriculturist.

Nothing can be more correct than the assumption that vegetable matters under fermentation, (which is a chemical change of the constituents of dead vegetable matter, effected by the play of electrical affinities,) produce acetic and carbonic acids, perhaps also the muriatic acid; and these would be taken up in their nascent state by any alkaline substance existing in the soil. Acetic acid would be carried off, were it not fixed by some chemical agent; but if it met with lime or potass, a neutral soluble compound would be formed; such, to an extreme degree, is the acetate of potass, a salt so greedy of water, that it liquifies if it be exposed only for a few minutes to the action of the atmosphere.

Leaves, and most vegetable bodies, affords manifest proofs of the presence of salts, particularly of salts of lime; not that they contain any chalk in its pure state, but they, in many instances, yield it to the mineral acids by mere digestion in them, without having undergone combustion. Thus, while we attest the truth of the chemical law adduced by Mr. Ruffin—that if any combination of lime with a vegetable acid "had been taken up into the sap vessels of a tree, it would be decomposed by the heat necessary to convert the wood to ashes; the acid would be reduced to its elementary principles, and the lime would immediately unite with the carbonic acid," produced by the process of combustion; we feel assured, by the evidence of facts, that mineral acids may attract from *green* vegetable substances the calcareous matters which lie masked among the cells of the plant, in a state of union with some unsuspected acid. I have thus detected, or rather produced, carbonate of lime, by digesting some sorts of moss in a weak cold solution of muriatic acid. I have also found a considerable portion in the leaves of a pine apple, but not to equal that which was yielded after combustion.

The combustion of vegetable remains, as leaves, haulm, sticks, and all such refuse, offers the ready means to furnish calcareous matters and alkali to land that is deficient of those important substances, in cases where it may not be easy to procure them in bulk. Many have objected to the process of burning, styling it a wasteful expenditure of manure; and so it may be considered if a soil be ill supplied with decomposable matters; but it is self-evident that, if farm-yard manure be abundant, and the land of a light friable nature, void of chalk; or, on the other hand, if it be clayey and too adhesive, the products of combustion must offer meliorating substances of first rate quality.

I cannot now dwell upon Mr. Ruffin's observations concerning the original constitution of what he terms *neutral soils*, or notice the changes they may have undergone; these considerations, and others which refer to his remaining propositions, must be, for the present, deferred.

I regard his essay as a masterpiece; he has therein practically demonstrated the importance and vast utility of chemistry. His knowledge of refined processes may, perhaps, as he leads us to infer, be somewhat limited; but he has shown that he knows enough to analyse correctly, to describe accurately, and to apply the principles of chemistry with the best effect.

I trust we shall soon be favored with the remaining parts of his essay, for science owes him much, and its friends cannot but be delighted with the aid she has received at his hands. A few more such papers, widely disseminated through the most influential channels, could scarcely fail to convince the most sceptical, that he who could thus apply to the operations of husbandry the scientific principles which he has acquired, must be, in every way, qualified to make the most of his land, be its quality what it may; and thus to increase his profits while he improves his practice of agriculture, and calls into action the utmost productive power of his farm by a liberal, but wisely directed system of tillage.

G. I. T.

October 21*st*, 1835.

From the Cultivator.

ON PUVIS' ESSAY ON LIME—MENTAL INSTRUCTION, &c.

January 11*th*, 1836.

Dear Sir—I read last evening Gov. Marcy's message, and this morning your last Cultivator. The former I consider excellent, with some exceptions; the latter decidedly the best number you have given to the public. It has less of the conjectural than any other which I have read. It has more phpsical science. By physical science, I mean the revelation of the laws of God. I think you are wrong in your remarks on irrigation. There is an immense loss in not saving the washings of roads. This is one chapter of irrigation. The price of hay at present would fully justify great outlays for irrigation, as practised in England. Your first article is excellent, as far as it goes; but if the writer had read Puvis' Essay on Lime, in the October and November numbers of Ruffin's Farmers' Register,* his reflections would have been nearer up to the time in which we live. We do not understand physical science in the United States. It is far better understood and applied to the arts in France. Lime has fed wheat lands, and wheat has fed man for 5000 years, and it is time the debt was acknowledged. The farmers in the Mohawk valley could afford to pay you

* Which will be published in the March and April numbers of the Cultivator.—Ed. Cult.

half a million of dollars for teaching them the use of lime.

I thank you for your little space to common schools. Why should uot the rising generation be taught the meaning of scientific terms of daily application through life? It would be perfectly easy and practicable. We all neglect our duty to the young. How easy it would be to teach every boy in this state, that portion of chemistry and geology, which is applicable to agriculture.

The results of our school libraries are most cheering indeed. The books are not stolen, nor injured, and are regularly returned, and what is more important, the books are read. These boys, when they become men, will understand your last Cultivator, which is more than can now be said of some of their fathers—but which every farmer *ought* to be able to understand.

W.

FATTENING HOGS—SEED CORN—WOODEN OX-CHAINS.

To the Editor of the Farmers' Register.

Madison Co., Va., Feb. 20th, 1836.

In the last No. of the Farmers' Register, you complain of a deficiency of original communications, and request that correspondents will hasten to prevent a continuance of such a complaint. This request is not the only inducement by which I am actuated in writing, but I conceive it the duty of every subscriber to communicate fully and freely, whatever information he may possess upon the subject of agriculture, whether much or little —for this is the principal source from which the utility of your now valuable Register is to flow. Then Sir, in conformity to this duty, I will proceed to make the following crude, and perhaps, unacceptable remarks upon the topics which head this communication.

The mode which is almost universally practised in fattening hogs, in this section of country, is not only wasteful and expensive, but unprofitable—which will be rendered quite obvious by reference to the 13th volume, 94 page of the American Farmer. But knowing that any effort of mine to cause the adoption of an entire new mode, would prove unavailing, I will therefore, as far as experience and facts will warrant, endeavor to point out what I consider an improvement upon the old plan, in point of economy at least, if it be not superior in many respects. The custom here is, to enclose a piece of land through which a stream passes, proportioned to the number of hogs to be fattened, in which they are confined, and fed upon nothing but corn in the ear, which is thrown in upon the ground or mud once or twice a day, in large quantities. When the corn is first thrown in, upon part of it, the hogs soon satisfy their appetites and become gorged, the remainder is trampled under foot in the mud and filth—this they never touch again and is lost. The plan which I would recommend, is not only more economical, and advantageous to the fattening hogs, but to the whole stock of hogs. It is this: the fattening hogs should be confined to a high and dry spot of ground, a south exposure to be always preferred. Instead of one pen, as is usual, have two of equal size proportioned to the number of the hogs; in the dividing fence between these pens there should be a slip-gap, so as to change the hogs from one pen to the other. The stock hogs should be kept in fields adjoining these pens, so as to be admitted into either pen by slip-gaps made for that purpose. Every thing being now complete, all that will be required, is to change the fattening hogs every three or four days, or as often as is necessary, from one pen to the other, and let the stock hogs have free access to the pen located by the other swine. The corn which was trampled in the mud and rejected, and which would have been otherwise lost, is now turned to account, and is greedily devoured by the stock hogs. This is not only sufficient to keep them in good condition during the fattening season, if the stock is not too large, but it is also beneficial to the fattening hogs to have the refuse corn thus removed, which if suffered to remain, might, by its putrefaction, prove injurious. Nor is this the only advantage, for by changing them from one pen to the other, it adds considerably to their comfort which consequently promotes their thrift. Thus the refuse corn is saved and the whole stock of hogs receive considerable benefit.

The following, I do not give as original or new, but to recommend their utility.

Seed corn—"like will produce like"—therefore in selecting your seed, gather none but the best, and that only from stalks which have borne two or more ears. By adopting this plan you will find, that the quality of your corn will not only be improved, but the product increased.

Wooden ox-chains. Get a gum sapling eight or nine inches in circumference, after being barked, and six and a half feet long—at each end of which, attach a chain, one foot long at one end and one and a half at the other, made as other ox-chains with a ring and hook. These short chains are fastened to the wood or pole by a crooked piece of iron called a nose, precisely like the iron or the tongue of a wagon that confines the breast chains. I have had one of these chains in constant use for several years, no part of which has ever been repaired, and can truly say, that it answers admirably well, both as it regards economy and the purpose for which it was made. The common chain made entirely of iron is more expensive, less durable, and in dangling about, sometimes gets in between the legs of the steers, which occasions both risk and loss of time.

With the most cordial wishes, sir, that the Register may be liberally patronized,

I am, yours,

INCOGNITO.

SOME ACCOUNT OF THE LABORS AND IMPROVEMENTS EXECUTED BY THE MARQUIS DE TURBILLY.

[Concluded from page 682, Vol. III.]

"The ground which I broke up in 1752, was pared and burnt in the same manner as that of last year, and produced an equally good crop. My other corn lands did the same; and I have since continued, and still continue, at the time of my writing this, to break up a parcel of heath, or other waste ground, every year. The success has answered; so that my improved lands now yield me every kind of corn which this country produces. Turkey-wheat, buck-wheat, and millet, have done

extremely well in some parts of them; and so have flax, hemp, and other productions suited to the different qualities of the soil. In some places I have sowed, at different times, several sorts of trees, such as the oak, the beech, the chestnut, the fir, and others, all of which thrive wonderfully. I have likewise planted new vineyards, and find them answer perfectly well. All these trials convince me more and more, that the very best way of preparing land, is by burning it, as I have already said more than once. Those who were formerly the readiest to blame my undertakings, now see their error, and commend them.

"During this same year 1752, as well as in the course of the following, I drained several marshes, and improved other pieces of uncultivated ground, which not being of the heath kind, or proper for paring, were broken up, and fitted for their respective crops, whether of corn, or of other plants, as will be more fully related in the second part of this account. I likewise sowed in these, as I had done before in other places, trees of every kind, some of which have succeeded, and others failed, according to the soil, and the manner of preparing it. This also will be more fully noticed hereafter, when I shall speak particularly of the different methods of raising trees from their seeds; and of the means of obviating the three chief difficulties which must of necessity be guarded against or removed, before one could properly set about breaking up any sort of ground; these are, water, stones, and large roots; each of which I have found it necessary to get rid of, before I could rightly begin any of my improvements.

"I endeavored this year to make some progress towards perfecting my instruments of husbandry; my new buildings went on according to the plan I had laid down, and were extended from time to time, in proportion as the products of my enlarged improvements, and the increase of my stock of cattle, required more room. I likewise tried to mend the breed of horses in this country, where their chief fault is, that they are too small.

"My sheep were also of too small a size, and yielded but little wool, which indeed is the case throughout this province. I therefore got from Lower Poictou, in the year 1753, two fine rams, of the large kind, called Flemish; by which means my lambs are much stronger than any other in these parts. Several of the males are almost as large as their sires, and I have give some of them to my neighbors for rams. They have produced a bastard breed, which increases apace, and, though not so large as the Flemish, yields more and better wool than our former breed. I got rid of all my old sheep by degrees, and have now a well sized flock: nor do I doubt but that if I could conveniently have purchased a whole flock of these large sheep, their breed might have been preserved without degenerating, and increased so as to supply the place of our present inferior species: for our uncultivated lands would feed a much greater number of sheep than we even attempt to raise.

"In 1755, I discovered limestome upon my own land. This proved a considerable saving; for I had hitherto been obliged to fetch my lime from a distance of near twelve miles. This stone, if properly searched for, may often be found in places where it is not suspected to lie. It is easily known by putting a piece of it into the fire till it be calcined, and then dissolving it in water. This discovery, in consequence of which I built a proper kiln, has enabled me to carry on my buildings with less expense than before, and is of signal service in affording an excellent manure for my land.

"I began this year to give premiums for agriculture to the inhabitants of my estate. They were instituted the year before; and I had long used my best endeavors to inculcate a general love of industry, and a relish for improvements. My success had induced several others, both landlords and farmers, to follow my example, as well in amending their already cultivated lands, as in the breaking up of new grounds. I assisted them in their undertakings, giving instructions to some, lending seeds to others, and money and tools to such as were honest, and wanted them. The better to encourage them all, I had given rewards every year to those who distinguished themselves most, and allowed my tenants sixteen shillings for every acre of new ground broken up by them: a regulation which still subsists.

"To fix these people in the industrious disposition to which I at length had brought them, no method seemed to me more proper than to take them on the weak side of almost all mankind, interest and vanity. Accordingly, I notified in the month of January 1754, that I would distribute every year, begining on the next ensuing festival of the Assumption, two premiums for agriculture; one, to the person who should raise the finest crop of wheat, and the other to him who should have the best field of rye. Each of these premiums consist in a sum of money, not inconsiderable for the country where it is given, and a silver medal, engraved for the purpose, of the size and value of a crown piece. These were, I believe, the first premiums ever proposed in France for this most useful object; though many have been given for much less interesting concerns. On one side of this medal is a sheaf of corn, with two sickles, a scythe, and a flail; over which are the words, *premium for agriculture*, and underneath, the date. On the other side are my arms, with this inscription round them; *to excite to industry the inhabitants of, &c.* I would not put the goddess Ceres of the ancients, or any emblematical figure upon this medal, because, in the first place, the ignorant peasants would not have understood its meaning, and in the next, some of them might perhaps, hereafter, take it for the representation of a saint, and honor it as such; by which means, what I intend only for an object of utility, would become a source of superstition or idolatry.

"A candidate for these premiums must have at least two acres of land sowed with either wheat or rye: they are given to the finest crop as it stands, to avoid all tricks; and if two crops are deemed equally good, the worst soil has the preference. When both the crops and the soils are alike, the largest extent of ground is entitled to the reward. The inhabitants of the place, in general, meet at the parish church on the day appointed; and, after divine service, choose from among themselves five who are not candidates, to inspect all the fields of corn, and mark those which they think the finest. On the next Sunday or holiday, they make their report to the same assembly. If any one complains that his corn has been unjustly passed over un-noticed, proper per-

sons are immediately sent, to examine whether the complaint be just. The assembly then appoint the same five as before, or others if they please, to go and inspect again, with the utmost care, the fields which they had marked, and to judge which two of them, one of wheat, and the other of rye, best deserve the premiums. On the next Sunday or holiday they declare their opinions to a general assembly of the parishioners, as before; and if no objection be made by any of those whose corn has been marked, this assembly adjudges the premiums accordingly: but if any one of them appeals, other proper judges are immediately chosen, and directed to inspect the spot. On the next Sunday or holiday, till which the decision of the premium is, in this case, of course put off; these last examiners make their report, and the matter is then determined. All the people thus sent by the assembly, are paid at my expense. In consequence of the decision of the inhabitants, the premiums are delivered publicly on the feast of the assumption, after the service at church is over. Those who win them, wear the medal, for a year only, fastened with a green ribbon to a button-hole of their coat, and have, likewise for that time, a distinguished seat in the parish church. These marks of distinction cease at the end of the year, when others succeed to them; but the medal remains the property of the person to whom it was adjudged. He may dispose of it as he pleases: yet, though he is no longer allowed to wear it on the outside of his clothes, there has not been a single instance of any one's selling his medal. They all keep it as a badge of honor.

"These rewards have been productive of so much good, and have raised so extraordinary an emulation among my tenants, that I cannot but advise every gentleman to practise the same method upon his estate. I intend to institute some others, for different productions; and as I am far from having a sufficient number of people to manage all my lands, if the whole of them was under culture, I have long thought of giving gratuities to such as shall have a child within the first year of their marriage, to continue this allowance to them so long as they shall have a child from year to year, and to allot a pretty considerable sum for the family which shall have most children. Some may, perhaps, think these encouragements for propagating the human species odd, and even superfluous: but they will be of a different opinion when informed, as they may be by the ministers of most country parishes, that many peasants are unwilling to get children, or at least do not choose to have more than a very small number, when they might have a numerous offspring.* If my abilities were equal to my will, I should already have formed all these useful establishments. It is generally allowed, and experience has particularly demonstrated it upon my estate, that an increase of culture produces an increase of inhabitants; and that wherever there is room for two, with the means of subsisting them, a marriage will ensue: but at the same time that this means of increasing population is encouraged by a more extensive culture of the earth, I see no reason why proper methods should not be used to induce men likewise to concur in the same laudable end.

"Ever since the year 1756, I have continued all my undertakings, and with the same success as before. Those who saw the condition of my estate when I first came to it, in the year 1737, now scarcely know again a single spot of it; so much is the face of the country changed. My mansion-house, which was formerly surrounded with dreary wastes, vast commons, and unbounded heaths, now stands in the middle of well cultivated fields; my improvements are become considerable both for extent and value; producing all sorts of grain, and natural as well as artificial grasses. I have dispersed in them all kinds of fruit-trees, and divided them into fields of proper sizes, separated by good ditches planted with quick hedges. Alleys of limes, poplars, white mulberries, chestnuts, and various other trees, besides being a considerable embellishment to the whole, afford convenient passes from one field to another, yield food to cattle, and are sown from time to time. I turn every thing to profit; even my driest soils. Many of my marshes are drained, and yield good crops. All my meadows by reason of their great extent, are not yet brought to the state in which I wish to see them; though a great part of them now produces excellent hay. I have mowed some of them twice a year, and hope by and by to do the same to others; for I intend to water them all, by making dams and sluices in the brooks and rivulet which pass through them.

"My vineyards are in good order; and my woods, which are now in regular cuttings, thrive perfectly. Some of these, which I have raised from the seed, have grown so prodigiously, that a stranger would think them much older than they really are. I have made some large reservoirs of water, and several ponds, entirely new, besides repairing the old ones. All these have succeeded, and yield good fish. A quarry of mill-stones, formerly abandoned, now turns to good account, and I have discovered several quarries of free-stone.

"I have been obliged to make several bridges over the brooks and rivulet which divide my meadows and marshy grounds, and have carried my roads as far as my improvements extend. Some of these roads lie over hills, which could not be avoided; though others have been cut through, at a great expense. Most of my out-houses, which are pretty spacious for all my cattle and all the produce of my land, with proper buildings for poultry, barns, granaries, &c. are finished; and I have built farm-houses with the stones which it was necessary to take off the lands, in different

* This is the only statement which has yet met our observation of such a practical operation of the "preventive check" to population—and the authority on which this stands, however respectable, does not remove our doubts of its truth. But difficnlt or impossible as it may be thus to check the increase of population, the contrary effect of increasing population can be easily produced, and has been produced with the most disastrous consequences, by acts of government: and if Turbilli's mistaken but benevolent scheme of premiums for births could have been extended throughout France, it would have worked to produce such horrors as the poor law system has done in England, and will hereafter do in this country.—Ed. Farm. Reg.

parts of my improvements, and settled in them young men, who are now married, and have children. Though my barns are very large, and not few in number, I have the pleasure to find that they would not contain all my last year's crop of corn: a satisfaction which I hope to enjoy still more amply in the next and following years.

"Thus my estate, which formerly yielded scarcely any thing, now affords every necessary for food and raiment. When there, I can, truly speaking, keep a very good table, and be decently clothed, with only the produce of my own improvements. I have no occasion to buy any thing except salt, sugar, and spices. My farmers have followed my example, so far as their means, and the helps that I have given them, have permitted.

"These improvements have, undoubtedly, cost me a great deal of money; but my income from them will soon be proportionably increased; besides which, it is proper to observe, that few lands will require so great an expense to break them up, as mine have done; owing to the uncommon stubbornness, inequality, and unkindliness of the soil: nor will it often be necessary to cut through hills in order to make roads, to lay causeys over quaking bogs, or to erect so many new buildings: though, even if all these difficulties should occur, I would still advise gentlemen to undertake the improvement. If they follow the directions here given, and profit by my errors, so as not to commit the like, I can assure them of success, at a much less expense than it has cost me, who have thoroughly paid for my apprenticeship. I can also promise, that they will lay their money out at better interest, and on better security, in this, than in any other way: besides which, they will have the heart-felt satisfaction of contributing to the prosperity of their country, to the increase of population, and to the enriching of others, at the same time that they enrich themselves.

"I have already said, that when I began my improvements, two and twenty years ago, a third part of the farms in my parish were untenanted, for want of farmers who would rent them; that most of the inhabitants of my estate were very poor, and did not in general, reap corn enough to support them half the year; that they were grown so indolent, that rather than cultivate their ground, which would have afforded them a maintenance, they chose to beg, like vagrants in the neighboring districts. Now their situation is very different, and they are no longer in that deplorable condition. They are become industrious, live by their labor, and beg no longer: they would even be at their ease (a happiness which I shall do my utmost to procure them,) were it not for obstacles beyond my power to remedy. The parish now reaps more corn than it consumes; so that the farmer here is enabled to sell at the very markets where he used to buy. All my farms are tenanted; not a house on my estate is empty, and if I build a new one it is immediately filled; in short the number of inhabitants in this parish, for I have an exact list of all of them, is double what it was in 1737. Such is the history of my improvements, and such are the effects with which tney have been attended."

For the Farmers' Register.

ON TARRING SEED CORN.

King & Queen County,
February 19th, 1836.

Agriculture is evidently the source of wealth, energy, and support of every country, and in none should it be more regarded as such, than in the United States. Every thing, therefore, which leads to instruct the farmer should meet with his grateful acceptance, and be looked upon by the community at large as a *public good.* I have frequently observed premiums granted by the various agricultural associations in our country to those persons who furnished them with the most approved methods of husbandry. I do not propose myself as a candidate for such honors, and yet I hope what I have now to communicate will be as extensively useful to the farming interest as many plans already devised. Almost all the tide-water section of our state is emphatically a *corn growing* country; hence, whatever course has a tendency to increase its product and lessen the labor of cultivation, must be deemed valuable. As the season for planting this great staple is rapidly approaching, permit me to suggest a few hints as to the excellent mode of preparing the seed corn.

Every farmer is well acquainted with the trouble and perplexity he is subjected to in re-planting his corn, merely on account of crows, black-birds, moles, squirrels, &c., which are ready (after the severities of the winter) to welcome him to the field as their benefactor. No sooner has he planted his field over than he may begin the laborious and disagreeable task. These *rioters* very frequently, indeed, invariably, by their depredations, cause a great deal of unnecessary labor. This is an evil—and how is it to be remedied? Such a a remedy must beof great importance to the farmer especially, and to the public in general. This is what I design to communicate—and it is as follows:—

I have for several years past previous to planting my corn, put it into a vessel, and put thereto as much tar (made thin by warming it a little, and diluting with three parts water) as would thoroughly wet the whole—then taking it out and mixing some plaster or unleached ashes by rolling them well together, which made it ready for planting immediately. This method has prevented the trouble of re-planting—the coat of tar and plaster being a preservative for the grain, and is a nauseous drug to these troublesome gentry, who so often rouse the anger of the farmer to no purpose. This is a method easily practised, and undoubtedly deserves the attention of the farmer.

If this shouid prove equally useful to such as wish to give it a fair trial, as it has with those who have already made the experiment, the communicator will think himself abundantly rewarded.

HUGH CAMPBELL.

From Loudon's Gardener's Magazine.

NEW MODE OF GROWING MUSHROOMS.

Not having seen in your Magazine so easy a method to grow mushrooms, for catsup and other purposes, as I have practised for several years, at litttle or no expense, I take the liberty to send

you the following sketch of my plan. The only expense is at the commencement, as it may then be necessary to get a few bricks of the best mushroom spawn: afterwards, enough may be saved every year from the dung, &c.

My plan is this. About the middle of July, when preparing the ground for early broccoli or Savoy, I have some of the best fresh horse dung, that is short, and has not much straw in it, dug in the furrow, under the soil where the row of broccoli or Savoy plants are to be planted. The furrow is filled pretty full of the dung, and trodden rather firm, and a few pieces of the spawn are put in it; the mould is then dug over it, and the digging is continued, until where the next row of plants is intended; which furrow is filled with dung and spawn as the former; and so on, as far as the ground is to be planted, and nothing further is required. I do not use any more dung in this way than would be required for the same quantity of ground if spread regularly over it in the usual way; and the plants grow more vigorously by having the dung under them. I consider that the broccoli or Savoy plants are of great service to the working of the spawn, by shading it from the hot sun and heavy rains.

About the middle of September, the mushrooms come up in the greatest quantities, large and fine. I have this morning(Sept. 21.) gathered nearly half a bushel of large mushrooms from about two poles of ground, planted as above; and have had two or three gatherings before, and expect to have a good many more before the season is over.

September, 21, 1835.

ON THE ABUSE AND PROPER TREATMENT OF WORK HORSES.

To the Editor of the Farmers' Registre.

Amherst, Feb. 21*st*. 1836.

I was much pleased with a communication signed W, from Charlotte, in the February No. of your useful and valuable journal, on the feeding of work horses. In no other portion of the globe, where that invaluable animal, the horse, is domesticated, is he more esteemed, more lavishly fed, and yet at the same time, more cruelly and shamefully neglected, than in Virginia, east of the Blue Ridge—and I am always pleased to see any effort made to meliorate the condition of this faithful and steadfast friend of man. It has been frequently a matter of astonishment to me, that the Virginians, with their proverbial fondness for the horse, (to say nothing of his acknowledged and indispensable value) should always have been, and continue to be culpably ignorant or negligent in what I will call horse-husbandry. Nine men out of ten pay no kind of regard either to his comfort or his nature. He is treated more as a machine made of wood or iron than as a living being. In winter he is exposed in wretched hovels to the "peltings of the pitiless storm," and in summer he is imprisoned in the same miserable gaols, to inhale the noxious stench and *malaria* arising from the putrescent excrement and filth of his stall. After a hard day's work, or ride, the unthinking (not to say unfeeling) owner (or brute) alights from the back of this faithful and jaded friend, and instead of going to his stall—in person attending to his food—seeing that it is neither too much nor too little, and of the right sort, and causing his stiffened joints to be rubbed, and the perspiration and dust to be curried from his skin and a soft bed thrown down, upon which the wearied creature may repose and resuscitate himself for the morrow's labor, as common gratitude and *interest* both would suggest, this submissive and uncomplaining servant is coldly consigned over to the tender mercies of the slave; and too frequently, after a day perhaps of unprecedented labor, spends a night of corresponding inquietude and misery. No wonder then, that we so frequently see such woe-begone and miserable looking jades tottering along in our teams. No wonder that the horse is becoming short-lived, and, as many farmers think, unworthy of raising; and no wonder that that long-eared, stubborn, ill contrived wretch, that thrives upon beating, the mule, is so fast succeeding and shoving out this noble animal. Your correspondent has well observed, "that the master's attention is half feed." Yes, sir, in this word *attention* is comprised, the whole wisdom of horse management; and this necessary attention needs no phrenological bump for its development; neither need a man "like a poet or painter, be born with it"—for it is so simple that any man, be he white or black, may learn it, or be made to learn it. Were I asked what is the best method for keeping horses in good order? Without stopping even to glance at what kind of food they ate, I should promptly answer *attention*. This is the whole and only secret; for whilst some kinds of food are decidedly better and cheaper than others, yet with *attention* a healthy horse will thrive on *any* food that he will eat. In the first place, attend to your stable—make it a comfortable house—let it keep out the rain and ward off the winter winds. In summer, when the weather is fair and hot, when you take out of harness at night, feed your horses in a lot adjoining the stable (leaving the stable door open in case of rain)—for it is too bad after a horse has labored hard all day, to cage him up in a narrow cell all night; turn him into a lot and let him wallow and walk about and enjoy the cool breezes. At least once a week (for the horse is a cleanly animal) clean out your stalls and throw the litter into your farm-pen. You will add greatly to your stock of year's manure, and infinitely to the health and comfort of your horse. As often as you clean out your stalls (or oftener) make your ostler throw an armful of straw or leaves into each. Water regularly. Bleed not unfrequently. As often as you think of it, if it is once a day, throw a small quantity of salt into the trough of each horse; and, finally, curry and rub in the morming, at noon, and at night; and whatever you may feed on, the increased strength and ability of your horse will amply compensate you for all trouble; and if a *blooded* horse, will be worth two of the best mules that ever were captured in Santer Fe. But the trouble (this great enemy to the happiness of the horse,) although it seems formidable at a distance, when you approach, it dissipates to nothing. Get into the habit *yourself* of attending to the comfort of your horse, and get your ostler or head ploughman into the habit, and he will soon take all the trouble off of your hands. Let your ostler find out, that you are *determined* to have your horses attended to—that you can, at a glance, tell whether they have been rubbed, curried, &c. &c.

as they should have been, and you will have no further trouble than to walk to your stable night and morning and look in. As soon as you *convince* him that this thing *shall* be done, he will do it; for one kind of work is the same thing to the slave as another—and he will do or not do this or any other work *well* as the master permits him.

Of the different kinds of food used for horses, my experience tells me, that what is generally in this section of the country called "chopping," that is, cut-straw and meal of any kind mixed together is decidedly the cheapest, and best general food. It is far preferable to corn and fodder in the usual way. With the horse, as with all other animals, an occasional change is of great service. Our neighbors over the Blue Ridge, whose horses are always fat, make their "chopping" of rye-straw and rye-meal; but we, on this side, who adopt this mode of feeding at all, do not much care what kind of straw or meal we use. For the last three months I have been feeding six horses on "ship-stuff" and corn meal, (half and half) and cut *wheat* straw—occasionally alternating with cut *shucks*; and I find it, if not the best, certainly as good, and cheaper than any other diet I have ever used. By this method, when they are not at work (when at work I give them corn and fodder at 12 o'clock,) my horses cost me a bushel of ship-stuff and a bushel of corn-meal per head per month; the straw I count as nothing. My ship-stuff cost me two shillings per bushel. It is frequently bought at 25 cents. I have not used one pound of blade fodder, and calculate by the saving, to sell fodder to twice the amount I paid for the ship-stuff; and my horses are as fat, or fatter than I ever had them in the winter. After clover comes in, I use little or no fodder—but feed on green or half-cured clover, and but little else; for a horse will frequently leave untouched the corn in his trough, if you fill up his rack with enough green clover to keep him going all night. I cut the clover in the morning, and let it partially *wilt* in the field till night, on which I feed at night and the ensuing day. Were it not so amazingly convenient to toss ten years of corn and a bundle of fodder to a horse, I am sure I should never give a grain of corn in the natural state as long as I live. It is a heating, indifferent food—and convenience and the dread of a *very little* trouble, I am convinced, are the causes which induce the great mass of farmers to persist in it—for whether we consult economy, or the welfare of the horse, we should certainly abandon it. I give my horses a quart of meal and ship-stuff a head, mixed up in half a bushel of cut-straw at a feed, in a square box, made for the purpose, holding fifteen bushels. I mix the corn-meal and ship-stuff together, and at each mixing I crumble up three or four bundles of lug tobacco and mix along with it. This answers two valuable purposes: it neutralizes that predisposition to costiveness, (and conseqently colic) common to horses in the winter season, and which prevents "cuffee" from robbing the troughs, which, whether it be a part and parcel of his very nature, or from a principle of *lex talonis*, (to wrong the master because he considers himself wronged,) he will be sure to do, unless you by some means prevent him, even though you were to give him a bushel of meal and a ham of bacon a day.

The horse is a noble, generous, ill-used animal. He ministers to man's pleasures and wants. In peace or in war, for work or for fun, he is the same docile, subservient, willing, obedient friend—and if, Mr. Editor, these hasty lines, and imperfect description of what I have found to be an economical and healthful diet, can be of any service either to the "gallant steed" or the "galled jade," he is welcome to the half hour I have devoted to it.

R. C.

From the Tennessee Farmer.

SUBSTITUTE FOR THE SPADE.

I have discovered a much easier and more speedy method of digging garden ground, than that performed with the spade, which is merely to substitute in its stead, the common manurefork—one, however, made square at top,for the foot to rest on, would be better. Mine is a coarse 3 pronged fork, the tines 8 inches long, ¼ inch wide, and ½ inch thick at the shoulder, and tapering to the point, and 7 inches in breadth, bent as much as a common spade—the handle straight or nearly so, and 4½ feet long. The advantage in working is, that it is easier forced into the ground than a spade, and the upper end of the handle being thrown forward to nearly arm's length, the fork descends perpendicularly into the earth—then, instead of lifting and turning, the process is rather rolling the lump over by lever power, first breaking it loose, then as the handle, with one hand near the end, and the other about the middle descends, the arm rests on the knee, and the forward hand becomes the pivot of a second lever, of less power than the first, and sufficient little forward motion, if the ground is somewhat adhesive, to turn over almost a cubic foot at once. If it inclines to turn backward,s drawing the fork partly out, will generally obviate that difficulty, but sometimes the old method of lifting and turning must be resorted to.

Ground dug in fall or winter, I conclude should be left rough, as presenting more surface to the action of the frost and air, it is in better condition in the spring than if made smooth, though finely pulverized.

Very respectfully yours,

G. H.

Dec. 12, 1835.

From the Farmer and Gardner.

THE RIBBON GRASS AGAIN.

A southern snbsciber writes us the following account of an experiment he has made since the publication of our friend Robinson's essay on the virtues of this grass, in transplanting it in a bog or quagmire, the result of which is not only highly satisfactory to himself, but is entirely corroborative of the statement made by Mr. R. The attention of gentlemen having unproductive marshes or bogs on their estates, should be awakened to the importance of the subject, and they should certainly lose no time in following the example of our correspondent, by carrying out the experiment of Mr. Robinson:

"This grass I have known ever since I was a

child. In different sections it has, like other plants, different names—It is called *Ribbon*, *Fancy*, *Fortune*, *Puzzle*, *Ladies*,' and even, I believe, is sometimes called *Witch's* Grass. I am confident you must have seen it, for I am greatly mistaken if I have not seen it in the cottage gardens in the suburbs of your city. It is the grass which many years since was much used on the borders of flower beds, and is in truth highly ornamental. Its general appearance when in a body, is that of deep green, but on examination, each leaf or blade will be found striped with white, yet no two can be found precisely alike, hence it is said by the boys that he who finds two precisely similar has made his fortune, and his lady love shall not refuse her smiles. From the ease with which it is cultivated, more I think than from its want of elegance, it is now generally ejected from the gardens of the rich, but the cottager, who seldom loses his taste for the beauties of nature, yet gives it a place in his little domain, and I doubt not that you will easily find and recognize it in such situations. In our little village, I think I shall procure sufficient quantity to plant half an acre the ensuing spring. You recollect that I did not commence taking your interesting publication until September, though I subscribed for the back numbers. On the night of the first day of Octobor, while watching by the bed-side of a sick friend, I indulged myself during the slumber of the patient, in looking over back numbers of the Farmer and Gardener, and my eye caught Mr. Robinson's publication. Before the sun rose, I went into my garden (for I am not rich enough to object it) and directed my servant to dig up about two square feet of the tufts, and immediately planted it in a morass near my house—a morass subject to occasional overflows by the tide, and one which has hitherto defied all my power to drain or dry, by ditching and dykeing. Though planted so late in the season, it grew apace, and now covers more than twice its original surface. There are even at this unusually cold time, green blades upon it. Some pigs were running in the morass when it was planted, and I observed that although it grew rapidly, they cropped it constantly, and seemed to prefer it to any other food. With that which was growing in my garden, I tried both horses and cows, and they eat it greedily, though it was old and partially dry. It is my opinion that this grass, together with the gama, are much more than doubling the value of southern states. The latter flourishes in dry and almost barren sands, and the Ribbon, (which in honor of Mr. Robinson, we ought to call Robinsine) I have no doubt will be found capable of converting pestiferous marshes into productive lands, and thereby subserve the health as much as the interest of the southern Atlantic States. For the covering which I anticipate from it to the dirty bog near my house, I would not accept any sum that could be offered. Indeed I think a few years must show how much we are indebted to the discoverer and publisher of its value and use, and for myself I am pained that I am unable to express my gratitude only by the feeble use of words.

While planting the grass, a tuft unobserved fell into a ditch, water always stands a few inches, and sometimes to the depth of two feet. In a week this tuft shot up spires several inches in length, and continued to grow until the weather became cold, since which it has disappeared; whether dead or not, the spring will decide. I also cut off some of the spires without root, and stuck them in the mud; they grew off at once, and I drew some of them afterwards, and found they had shot out roots in every direction; but since the cold weather they too have disappeared, but I hope yet to see them burst into life with the returning spring. You will at once say that I am an enthusiast, to make such high estimate upon such slight grounds, and so indeed I am. I know that this is not a fair trial, but it is a trial under every possible disadvantage—the season late, the place a perfect quagmire, so very spungy as not to bear a man without the aid of a plank to sustain his weight; yet here it grew rapidly. I know it bears summer sun on high land, and therefore have no fear for it in the swamp, since I have found it to flourish well in that situation. Should no unforeseen accident intervene, I will next autumn give an accurate statement of the result of my experiment. You may think this is written for publication, but it is not so intended, and yet I am anxions that the value of the *Robinsine* should be known; but I am not a farmer except in theory and in contemplation—my possessions number less acres than my age numbers years, and therefore I cannot be "a teacher in Israel."

From Loudon's Gardener's Magazine.

ON THE MODE OF RAISING MUSHROOMS FROM THE MUSHROOM STONE.

By Mr. James Alexander, Gardener at Maeslaugh Castle.

I have no doubt but you, and many of your correspondents, are acquainted with the mushroom stone; but, as I have not seen it mentioned in your Magazine, I send you the following account of one that was under my care for upwards of two years. It was sent to Mr. Thorburn of Murth, from Calabria, in Sicily, with directions to give it a little water when it appeared dry, which was generally three or four times a week in dry weather: and, in the course of a fortnight after I received it, a couple of mushrooms made their appearance, which grew to be very large; I think, about 9 inches in diameter. They were porous beneath, in place of gill, as in the common mushroom; consequently, they appeared rather to be a species of Bolètus than a species of Agáricus. However, they were of excellent flavor, and the ship captain who brought the stone home told me that it produced three mushrooms at sea, which, he said, were very fine. In three or four weeks after the two above-mentioned were gathered, three or four more came up, and so on, for the first year. The second year it was not quite so productive; and, in 1833, my successor informed me that the mushroom stone was nearly exhausted. I think eight or ten such stones would supply an ordinary family with mushroom for two or three years.

Maeslaugh Castle Gardens, June 16, 1835.

From *British Husbandry*.

ON PUTRESCENT MANURES.

[Continued from p. 661, Vol. III.]

Compost.

We have already observed upon the expediency of mixing the bottoms and crusts of dung-pies with the other materials of which they are composed when they are turned over; but the quantity may not only be greatly augmented by a larger addition of earth, but, by imbibing the juices of the dung, a *compost* is thus formed of excellent quality in its application to most crops, as well as soils, and especially to grass-land. It has indeed been objected to this, that the mixture of earth increases the size of the dunghill without adding to its virtue, while the expense of carriage is also thus unnecessarily incurred, and that the more manure is reduced to its essence the better. But, although this may, in some instances, be true, yet experience proves that a compost of this nature becomes converted into a very fertile mould, and in some sorts of unkindly land, small dressings are of little benefit. On such soils, portions of pure rotten dung get fast locked up in large clods, and are rendered useless to that crop; but the increase of bulk, by the addition of earth, admits of a much larger heap being applied, as well as of being more readily united with the ground by the plough, so as to render the tilth more manageable. In many cases, the mixture has been therefore found essentially useful; and though the charge of cartage is certainly an object of moment, yet that may be lessened by forming the composts upon the headlands of the fields to which they are to be applied. They may also be put together at any time of the year, which, especially in summer, is of itself an incalculable advantage. The ground should, however, in that case, be previously summer-fallowed, unless it be entirely free from weeds; or a small quantity of quicklime may be added to them, or between the earth and another layer of any other ingredient not so easily decomposed as the dung. The heap then ferments, and in that state it is left until it be completely cooled to the centre. When the heat has entirely subsided, the compost is to be then turned in such manner as that not only the uppermost part shall be underneath, but also that the outward portion be put in the middle, and that the whole be intimately mixed. If any part of the dung be dry, it should be well and equally wetted—if possible with urine, or with the drainings of the farm-yard—as each layer is removed, and previous to their mixture. The number of turnings must depend upon the state of putrefaction of the dung, as well as that of the turf, if sods or other materials have been added. The proportion of dung, or other putrescible substance, to earth, must be governed by the qualities of both, and by the judgement of the farmer in their selection and use. The following —which has been adopted in Norfolk—will afford a general idea of the mixture of such a compost, when confined to mould and farm-yard dung:—

Mould for the bottom	160 loads.	
Dung from the bullock-yard and stables, a load of each alternately	112 loads.	
Mould for the next layer	42	
Dung for ditto		48
Mould for the top and sides	42	
Total	244 by 160	=404 lds.

which, after being turned twice over, produced 300 loads of manure, and was intended for 20 acres.*

Another practice prevails among many farmers, which, so far as the production of manure is concerned, has the advantage of allowing the compost to imbibe the whole of the urine in the yard, but which is also attended with the inconvenience of bedding the cattle in a manner which, without great care in its frequent removal, must expose them to much want of comfort. It is as follows:—

Turf, or any other species of earth, is spread over the yard to the depth of upwards of 2 feet, except around the buildings, to the extent of perhaps 6 or 7 feet, which is left as a path. It is then covered with furze,† or fern, if to be had, and laid over with straw, to which the littter from the stables is also added, and upon this bed the feeding-cribs of the store cattle are placed. In this manner the dung is often allowed to accumulate during the entire winter, or until it rises to such an inconvenient height as to compel its removal; it is then either piled in the yard, after being mixed and covered over with earth, and left there until it may be wanted in the autumn, or else carted out to the mixen, and there treated as already stated.

The materials, and the stock thus employed, were in one instance—

591 loads, of 18 bushels each, of earth	7 horses.
10 wagon-loads of subble	7 cows.
11 do. of fern	3 calves,
46 loads, of 36 trusses each, of straw	besides hogs.

The horses were fed as usual, and the other stock had cabbages in the yard. The quantity of manure which they produced, after it had been turned over in the latter end of May, amounted to rather more than 1000 loads of 18 bushels; and the whole expense of cartage in and out, and the labor of turning and spreading, with the cost of the fern and straw, amounted to £45 11s. 10d., which would probably be increased by present prices to about £60.

In another, 136 loads of earth were laid in the yard, at nearly equidistant periods, from November to the end of March, to which were added the following materials, a large portion of which was consumed by the stock:—

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* Rigby's Framingham, p. 97.

† The bottoming of yards with furze has been objected to, because, if cut at an advanced period of its growth, it is extremely difficult to decompose. Where haulm and straw are scarce, it is, however, of great use in forming a dry bed for cattle; and when the dung is carried from the yard, the furze may be very easily separated, and placed in another compost with similar matters, or mixed with a small quantity of quicklime, which will soon prepare it for use.

5 wagon-loads of subble
25 do. of fern

The product of 4 acres of oat-straw
5 loads of do.
19 do. of hay.

6 working horses.
4 cows.
1 yearling and 30 sheep, besides lean hogs, fed on cabbages & turnips.

The yard was kept littered about 6 inches deep with fern, to soak up the urine, and the dung from the stables and cow-houses was carried out and laid upon it—hogs being the only loose stock allowed in the yard; but the thirty sheep were penned nightly upon fern only in one corner of it. The manure was not therefore trodden by cattle, but was piled up occasionally, as it accumulated, to the height of near 7 feet, when another heap was clamped up. The total amount, after having been duly turned, was 390 loads of 18 bushels (of which the sheep produced 23 loads,) and the whole expense, including the charge of mixing and turning an extra quantity of 70 loads of the dung of a former year—but not adding the cost of the hay—was £25 18s., which might amount at present prices to £35. It must, however, be observed that it contained a larger proportion of dung than the former compost, and that this mode of preparation allows of its being got ready at different periods, without mixing the first portion with fresh dung; so that the first heap was in excellent order for use early in the spring.* Its precise effect upon the land has not been stated; but no farmer can be at a loss to conjecture its value, and from these data the cost of similiar composts can be easily ascertained.

In using turf, or any kind of grass, in the mixture of a compost, it will be proper to recollect that, if taken up during most parts of the summer and autumn, it will not only be found generally impregnated with the seeds of weeds, but that grub-worms, wire-worms, and various other insects, usually select dry banks by the road-side, hedge-rows, or dry pasture, in which to deposite their eggs. When turf, or earth, is carried from such places, and added to the compost without having been previously subjected to the processes of tillage, the greatest care should be taken, either that it be turned up a full twelvemonth before it is applied to the land; or, as we have already observed, that quicklime be strewed between the sods, in order to guard against every chance of their propagation.†

The application of dung

to different soils and crops, though matter of wide discretion to the farmer, is yet a subject which admits of a few general directions.

Notwithstanding what has been already said respecting the practice of those farmers who allow this manure to lie for a long time upon the surface of the land, we however agree with the opposite opinion—that it should be spread the moment it is taken from the cart, and completely incorporated with the soil;‡ for by tillage it becomes amalgamated with the inert particles of the earth, through which means both that and the dung form one substance in the fittest state of nourishment to promote vegetation.* It should not, however, be deep buried in the soil at first; for, though it is the prevailing opinion of many persons, that, by deep covering, the dung is defended from the injurious effect of exhalation—that the roots of plants soon find their way to it—and that it will be raised higher by after-ploughings—yet there are men of accurate observation who, from long experience, have found that, if dung be only just covered, the nearer it is to the surface the greater are its effects in promoting fertility, for then it lies near the roots of young plants at the time when they need the most cherishing aliment. They also declare, that dung never rises to the surface after it has lain mixed for a season with the soil; but, on the contrary, that, as it dissolves in the earth, the solution descends as low as the soil has been stirred by the plough.†

It is another rule in the application of farm-yard manure, among good farmers, not to use a greater quantity at one time than may be supposed capable of producing a good crop; for, although land can hardly be rendered too rich for the production of green crops, yet wheat, barley, oats, and rye have often been so much injured by a profuse supply of dung, that they have run almost entirely to straw. We have lately seen wheat, on good and well-tilled land, in the possession of an extensive coach-master, which has scarcely yielded two quarters the acre, in consequence of the application of stable-dung; and it is well known that a good crop of grain cannot be grown upon a dung-hill. It should not, however, be too sparingly administered, for if an insufficient quantity be laid on, it may not reimburse the expense; whereas a full supply will probably have the effect of producing an abundant crop. A medium should therefore be observed; but so much depends upon circumstances—upon the strength of the manure, the nature of the soil, and the intended crop and culture—that no precise amount can be stated. Various calculations have indeed been made by different writers upon the subject, but they are generally so vague, that they only estimate the quantity in *loads*, by which no precise meaning can be defined, for it must depend upon the size of the cart; and even when calculated in cubic yards, the weight will differ according to the state of the manure, though one cubic yard of well-rotted dung may be generally supposed to average about 11 cwt. A well-heaped one-horse cart will carry nearly a ton, and those drawn by two horses about 1½ ton; a small wagon is also commonly supposed to contain two cubical yards, each consisting of 27 bushels, when estimated by strike-

* See Nos. ii. and iii. of the first article in vol. iii. of the Papers of the Bath Agricultural Society; and Holland's Survey of Cheshire, p. 227.

† See Blaikie's Appendix to his Essay on Farm-yard Manure, edit. 1828, p. 27.

‡ Sinclair's Code of Agriculture, 3d edit., p. 220; General Report of Scotland, vol. ii. p. 521; Brown of Markle, on Agriculture, vol. i. p. 398.

* This has been exemplified by the observations of Marshall upon a crop of wheat of 4 quarters the acre obtained from his own farm, after peas, which had been dunged and thoroughly incorporated with the soil; while another field of wheat, sown at the same time, and fresh dunged with fine spit-dung, superior both in quality and quantity, but which had been ploughed in large lumps along with the seed, only produced 2 quarters. Min. of Agric.

† Naismith's Essay on Manures, vol. ii. of the Appendix to the General Report of Scotland, chap. xii. p. 32, note.

measure, and twice as much if heaped; or a proportionate quantity in weight.*

On *strong soils*, farm-yard manure is very commonly applied to a summer-fallow for wheat; and when that process forms part of the rotation, it is the opinion of most intelligent husbandmen that it can at no time be more profitably employed. The season is then so far advanced as to have afforded time for the preparation of the winter dung, which, on clay-land, where green crops are not generally grown, and the practice of summer soiling is not adopted, is otherwise a difficult matter; but when applied to corn-crops, it should be either already decomposed, or, if fresh, it should be allowed to remain so long in the ground, previous to the seed being sown, as to allow of its fermentation being completed; for it will otherwise occasion the growth of weeds, which, if not eradicated, may ripen before the ensuing harvest, and thus infest the land with future foulness. When the operation has been well performed, and the ground has been thus completely cleansed it is then found to be so well divided, that, if minute attention be also paid to the spreading of the dung, it becomes so thoroughly intermixed with the soil as to ensure a greater return than if it had been laid on during any other periods. The practice is also not uncommon of laying it upon clover leys preparatory to a crop of wheat, or of spreading it upon greensward a year or two before the land is broken up; but the advantages of this latter mode have been doubted by some, though many experienced practical farmers highly recommend it.

On *light land*, on which the rotation of crops usually commences with turnips, it has been found by experience that the dung should be well rotted; it is therefore generally mixed twice, in order to get it into a fit state; but, as Swedes are commonly put in the ground by the middle of May, the manure cannot be properly prepared by that time, unless the yards have been cleared during the winter, and much of that which is thus applied is over-year muck. This, when the crop is drilled, is laid as evenly as possible in the hollows of one-bout ridges, which are afterwards split by a double-mould-board plough, which covers the dung, by turning them over, and the seed is immediately sown above it; but when sown broad-cast, it is regularly laid over the land, generally before the last ploughing, though some farmers give it a second stirring. When potatoes are planted, the manure used is almost invariably stable-dung, when it can be procured in sufficient quantity, which is laid in a shallow seed-furrow immediately under—or, in some cases, over the cuttings; but care should be taken that it be put so deep in the ground as to be out of the way of the harrows, or, otherwise, their hold of the straw might occasion the sets to be removed from their seed-bed.

Even when bare fallows become necessary to clean the land, soils of this description are rarely dunged when followed by corn; for they are thereby rendered so open—especially if long dung be used—that the plants are apt to be thrown out by slight frost in the spring, and perish for want of a sufficient hold of the ground. This necessity for the employment of rotten dung not only lessens its bulk, but it must be also borne in mind that the same quantity of straw is not produced as upon rich clays; and although the deficiency of manure thus created may be partly made up by feeding sheep upon turnips, as well as by a smaller quantity being used than upon strong land, yet the exhaustion of light soils is more rapid; they therefore require more frequent replenishment, and no pains should be spared to increase the amount of dung.

On *grass-land* in the neighborhood of London, where the finest meadow-hay in the kingdom is grown, dung of every kind is laid on in all states, both fresh and rotten; and much town-manure, or street-slop, partly in a liquid state, is thrown over the ground in the same condition as when taken out of the carts and barges. It is a cold, clayey district lying on the north side of the Thames, in Hertfordshire and Middlesex, and has been brought to its present fertility solely by the aid of an unceasing application of manure; many of the farmers being under covenants in their leases to lay on a thick coat of stable-dung, thoroughly rotten, in every third year: others apply it fresh—in which state it is said that, 'load for load, it is to the full as good as when rotten'†—and after it has been washed in by the rain, the straw that remains is raked off and added to the dung-hill. There can perhaps be little doubt that dressing the land with dung in a state of fermentation, when diluted with water, is the surest way of im-

* In the General Report of Scotland the quantity of farm-yard manure usually applied to fallows is stated to be from 14 to 20 double cart-loads, of about 1½ cubic yard each—to the Scotch acre—equal, on an average, to about 14 per English acre; and from 10 to 15 for turnips: vol. ii. p. 519—521; which, it may be presumed, includes both light and strong soils.

Malcolm calculates in loads, which may be supposed to consist of a cubic yard for farm-yard dung, on the following soils and crops, per acre:—

	On strong lands.	Medium loams.	Gravels.	Chalks.	Sands.
For wheat	30	20 to 25	25	20	20
Barley	25	20	22	16	18
Turnips	30	20	25	20	20
Clover	15 to 20	15	20	16	16
Sainfoin	—	—	—	20	—
Pasture	15 to 20	15	16	16	16

Together with various other estimates for the separate dung of cattle and different materials. Compendium of Modern Husbandry, vol. ii. p. 19.

† Survey of Essex, vol. ii. p. 231.

parting nourishment to plants; and in that view, after the hay has been carried off the land, farmers watch for a change of weather, and, when the barometer indicates an approaching fall of rain, they lay on whatever manure, they possess; but if the season continues settled, the dung remains untouched until about the end of September at which time it is applied while the ground is sufficiently dry to bear the drawing of loaded carts without injury, and when the heat is so moderate as not to exhale its volatile parts.*

In all these cases the product is abundant, because the land, though cold, yet grows good grass, and whatever may be the nature of the manure, sufficient is always laid upon it to secure a crop; but it is only in the vicinity of the metropolis, or in other great towns, and through means of purchased manure, that such a supply can be obtained as that given to the land in question.

The use of compost of earth and farm-yard dung has been used as an argument against its employment upon meadow-land, because of the difficulty of its entrance into the soil, and that pure dung has a more immediate effect upon the crop. Upon land such as that just mentioned the objection is well founded; but upon soils of a loose texture the mixture of earth—particularly of clay—with the dung, by increasing the bulk to be laid upon the land, tends to bind it, and thus giving a firm hold to the roots of the grass, the finer sorts, which either have not strength enough to penetrate the ground, or the seeds of which have lain dormant, suddenly spring up, and the sward is thus improved. Of this a striking instance in point has been related by Mr. Dawson of Frogden, who, 'having occasion to carry a quantity of very fine black loam from a head-ridge of old infield land, to give the surface-water a free passage, it was laid upon out-field bent-grass-land adjoining, of which it covered about a quarter of an acre fully an inch thick. No grass-seeds were sown upon this new covering, yet white clover and other fine grasses sprung up, and gradually increased upon it; and the bent, upon which the loam was laid, diminished so speedily, that very little of it remained in the third year thereafter.'† It is, however, well known that the effect of dung is proportionately greater upon good than upon bad land, and the difference is still more considerable upon that which is under grass than what is arable; for it is observable that the dung of animals has scarcely any effect upon coarse pastures, but it perceptibly improves those which are covered with the finer grasses, and is of more or less value as herbage of the former or latter description predominates. This improvement is, however, far more sensible when aided by the application of lime, as we shall have occasion to notice when we come to treat of that fossil.

* Middlesex Report, 2nd edit., pp. 286, 287, 877. In the Leicestershire Report it is also said, 'Dung or compost should be laid on meadow-land immediately after the hay is carried off; for as at that time the ground is generally the driest of any time of the year, carting on it will not cut the turf: there is the least grass to destroy; it ensures good aftermath; and the winter rains will wash all the manure into the soil, so that it will receive the whole benefit of the dressing.' —P. 191.

† Farmer's Magazine vol. xiii. p. 69.

There is, indeed, evidently a mistaken practice throughout most parts of the kingdom with respect to the application of manure. The custom alluded to is that of laying it upon land of inferior quality, while that of a superior kind is in equal want of improvement; the better part of many farms being thus in some degree impoverished by attempting to improve, at an evident loss, the poorer parts. Others, indeed, follow the opposite system; but, when justice is done to the land, every part in rotation should receive the manure arising from its produce. There are, however, some rare instances of ground of so rich a quality, that, by laying any manure upon it an injury would be sustained; but, upon the whole, it is an evident fact that any manure whatever—if not of a nature unsuitable to the soil—will be always attended with a proportionately better return when laid upon good, than upon poor land.*

In the spreading of dung upon the land, the common practice is to put it first out of the carts in hillocks, and afterwards to spread it upon the ground. Many farmers, however, take the opportunity of carting out their manure during a frost, and there leaving it in heaps until a thaw. The convenience of this is evident; and perhaps, during that weather, no great damage will happen to the dung, nor can much of its juices be imbibed by the soil: but if thus left, even for a short time, in open weather, the spots upon which it is laid get more than their share of the dressing, for the moisture is imbibed by that part under the manure, whilst the upper parts are dried by the action of the air, and lose some portion of their fertilizing power. Its effect is thus unequal; the crop will vegetate more luxuriantly on those spots, and the harvest will not be uniform. There is also this inconvenience in thus leaving it upon the soil—that, if the land lies upon a declivity, a considerable portion of the manure may be washed out by the rain, and either carried to the lower part of the field, or else lost in the ditches.

Another mode is for both the carter and the spreader to stand in the cart, and shake the manure out with forks; but although this has the advantage of a more ready distribution, yet, if the men drop a forkful by accident, or do not scatter a lump in the manner intended, they cannot stop to divide it, and it must lie where it falls. The repeated stoppage of the horses also occupies much time. Both these modes are therefore attended with inconvenience.

When carefully done the distance to which the dung is to be carried to the field should be ascertained, and such a number of carts employed as will give constant occupation to both the men and cattle: thus, supposing three to be sufficient, then two teams only—of whatever number—are to be worked, one going and the other returning, while the third cart is left standing at the dunghill to be filled, and replaced by the one which has returned empty, the cattle in which are then taken off and harnessed to the other, so that no time is lost. It should be spread immediately, and can never be done at any other time so cheaply. It is, indeed, decidedly the most economical method for the carter to spread it from the carriage; but as he cannot do this with the minuteness which is requisite to separate it completely and spread it equally

* Holland's Survey of Cheshire, p. 243.

over the soil, such a number of women or children, attended by an overseer, should be employed to follow the carts, as will effect this in the most perfect manner. That number will of course be regulated by the condition of the manure, the quantity to be used, and the distance from which it is drawn. The farmer himself, or some trusty person in whom he can confide, should not only determine the number of loads that are to be spread upon each acre, but should carefully regulate the distance which each load should cover, by measuring the quantity of land: this, when it is laid on in regular ridges, is very easily ascertained by pacing them, and summing up the length and the breadth of the ridges; and then it is only needful to direct the carter to make each load cover a certain space—as one load upon one ridge, or three loads upon two ridges, &c. But if it is determined to lay down the manure in small heaps for the followers to spread entirely, in this case, the distance of each separate heap should be paced over and marked.* The regularity of the distribution of manure ought never to be intrusted to common laborers without superintendence. If the carter be employed, unless a boy be given him to drive, the necessary degree of equality can hardly be expected. It may also be sometimes advisable to lay a larger quantity upon one part than upon another of the same field, for the soils may differ; or it may lie upon a declivity, in which case it will only be prudent to put more upon the upper part than upon the bottoms; for, even under the most careful distribution, they assuredly will receive an additional portion, which will be swept from the heights. Care is also requisite, in carting out dung and all manuure, to make the drivers keep on the head-land till they come to the end of the land which is manuring, so as to make each ridge bear its exact proportion of damage; or, for want of such attention, the men, if left to themselves, make roads across from the gate in every direction, to the great injury of the crop.†

Such is the most approved mode in the broadcast manner; but where the drill husbandry prevails, it is by no means unusual to lay the dung in the intervals of these small ridges, as practised for turnips throughout Scotland and the north of England. The drills are in this case generally formed at the distance of 27 inches, or thereabouts, from the centre of each; and by driving the carts along the middle one of the space intended to be manured, the dung is drawn out in such proportions as may be judged necessary. If the breadth of three drills be only taken at a time, the dung stands a better chance of being equally laid in them; for it often happens that, when a greater number are included in one space, the outside drills receive a less quantity than those which intervene. Others, however, thinking that by only taking three drills at a time, the travel of the horses is unnecessarily increased, take five drills into one space; but, in that case, the number of spreaders must be increased, as at least one is requisite to each drill, and unless care be taken in the superintendence, some inequality will occur in the distribution. It is, however, obvious that the labor of the teams, as well as the poaching of the land, will be thereby lessened; and if a sufficient number of spreaders be employed, the work will also be more speedily executed. Women and children, having light grapes, or forks, are strong enough —four are generally found sufficient for what is called 'a head of carts;' and the spreading is adroitly perfomed even by small boys and girls, after they have been a little time accustomed to the task.*

It is obvious in the ploughing down of dung that, if it be not turned down accurately, it becomes partly exposed to the atmosphere, instead of being buried in the soil. Skim-coulter ploughs have been used to obviate this inconvenience, but —especially in the case of long dung—there is great difficulty in preventing it from choking the instrument, thus occasioning a great increase of draught to the cattle, as well as of labor to the ploughman, rendering the land foul, and defeating one of the main objects of good husbandry. It is also, by some farmers, expedient to bury fresh dung so deep below the soil as to allow it to ferment there without being disturbed by the harrows, or even by the shallow ploughing of successive tillage; but independently of the objection which has been already raised against that practice,† it is not, in any such case, found easy to make clean work.

Many attempts have been made to correct this fault, and considerable improvement has been effected in the construction of ploughs, particularly by the Scotch, some of whose iron swing ploughs have gone far towards a remedy of the defect. One lately invented by Mr. Finlayson, under the title of the 'patent self-cleaning plough,' which we shall hereafter have occasion to describe, seems to merit particular attention.‡

As relating to the quantity of *farm-yard dung necessary for raising a course of crops* upon arable land of various soils, and under different systems of cultivation, with the proportion which they are capable of producing, it has been justly remarked by Dr. Coventry 'that ignorance, and wrong notions about the matter, have produced serious errors in practice; and the information concerning it found in books of Agriculture is in general scanty and seldom correct. It is therefore, an object of primary importance to ascertain, as precisely as possible, what are the particulars that merit chief notice on the subject of cropping, the selection of the most proper species, the proportion that should subsist between them, and the most convenient order in which they should be raised.'§

The latter subject, will be duly considered when we come to treat on the rotation of crops, and we have already noticed the average product of land of ordinary culture and fertility;‖ but, assuming some admitted facts as data upon which to ground our opinion of the quantity of putrescent manure

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* A table, stating the number of heaps or bushels per acre, will be inserted at the close of the subject of manure.

† Norfolk Report, chap. xi. sect. iii.; Marshall's Midland Counties, vol. ii. p. 37; Brown, of Markle, on Rural Affairs, vol. i. p. 399.

* Farmer's Magazine, vol. v. p. 165.

† See p. 259, l. 4.

‡ See Finlayson's Ploughman's Guide, with engravings, 2nd edit.

§ Essay on Manures, by Dr. Coventry. See the Quart. Journ. of Agric., vol. ii.

‖ See pp. 253, 254.

which may be generally sufficient for an acre, we nearly agree in the opinion expressed by the Doctor, and collected from many other accounts, that from four to five tons are yearly requisite of that kind commonly prepared, and in its usual state of decomposition, as spit-dung. According to that calculation, it must also be observed that the course of crops is supposed to consist—on light soils, of the alternate plan of corn and green crops—on clays which do not admit of that system, that the holding contain a proportionate quantity of grass-land; and that the quantity of manure should be supplied, not in small quantities annually, but in large ones, at intermediate distances of four, five, or six years. Light soils, in the common course of husbandry, rarely require the application of putrescent manure oftener than once in four years, and in all cases where the clover is allowed to stand during two seasons, it may be deferred without disadvantage for another year. Heavy soils may run six years without it, provided that the land be laid one year in fallow, and that there be sufficient meadow to be reckoned, at least as one crop in the course. It being, however, clearly understood, that—whether on light or heavy land—nothing but grain, seeds, and live stock is to be sold off the farm, unless replaced with an equal portion of purchased dung; that the whole of the green crops, the haulm of pulse, and the straw of corn be used in the most economical manner; and that some of the live stock be either soiled or fattened upon oil-cake: which plan, if carefully pursued on good soils, with capital sufficient to secure an abundant working and fatting stock of cattle, ought, under fair management, to furnish an adequate supply of dung for any of the usual courses of culture.

Having thus submitted to our readers all that occurs to us of importance on the subject of farm-yard manure, we shall here recapitulate a summary of the chief points which we deem particularly worthy of their consideration:—

1. To bottom the farm-yard with furze, fern, dry haulm, or any other loose refuse that takes the longest time to dissolve; and over that to bed it deep with straw.

2. To occasionally remove the cribs of store cattle to different parts of the straw-yard, in order that their dung may be dropped, and their litter trodden equally.

3. To spread the dung of other animals, when thrown into the yards, in equal layers over every part.

4. To remove the dung from the yard at least once, or oftener, during the winter, to the mixen.

5. To turn and mix all dunghills, until the woody or fibrous texture of the matter contained in them, and the roots and seeds of weeds, be completely decomposed, and until they emit a foul putrid smell; by which time they reach their greatest degree of strength, and arrive at the state of spit-dung.

6. To keep the dung in an equal state of moisture, so as to prevent any portion of the heap from becoming fire-fanged. If the fermentation be too rapid, heavy watering will abate the heat; but it will afterwards revive with increased force, unless the heap be either trodden firmly down or covered with mould to exclude the air.

7. To ferment the dung, if to be laid upon arable land during the autumn, in a much less degree than that to be applied before a spring sowing.

8. To lay a larger quantity on cold and wet lands than on those of a lighter nature; because the former require to be corrected by the warmth of the dung, while on dry, sandy, and gravelly soils, the application of too much dung is apt to burn up the plants. Stiff land will also be loosened by the undecayed fibres of long dung, which, although its putrefaction will thus be retarded, and its fertilizing power delayed, will yet ultimately afford nourishment.

9. To form compost with dung, or other animal and vegetable substances, and earth, for application to light soils.

10. To spread the manure upon the land, when carried to the field, with the least possible delay; and, if laid upon arable, to turn it immediately into the soil.

11. To preserve the drainage from stables and dunghills in every possible way; if not applied in a liquid state, to throw it again upon the mixen.

12. To try experiments, during a series of years, upon the same soils and crops, with equal quantities of dung, laid on fresh, and afterwards rotted; in order to ascertain the results of their application to the land. The whole quantity to be first weighed, or measured, and then divided.

The fermentation of farm-yard manure is in fact, a subject of far greater importance than is generally imagined, for on a due estimation of its value mainly depends the individual success, as well as the national prosperity, of our agriculture. The experiments to which we point cannot therefore fail to come home to the interest of every man; they may be made without expense, and without any other trouble than the mere exercise of common observation and intelligence. Leaving, however, aside the discussion concerning the disputed worth of fresh or fermented—of long or short dung—let the farmer sedulously bend his attention to the accumulation of the utmost quantity that it may be in his power to procure. The manner and the time of using it, in either state, must, however, be governed by circumstances which may not always be within his control; and every judicious husbandman will rather accommodate himself to the exigency of the case than adhere strictly to his own notions of what he conceives to be the best practice. In fine, whether favoring the one or the other side of the question, let him collect all he can; apply it carefully to his crops; and then, trusting to events—*'let the land and the muck settle it.'*

[To be continued.]

IS THE CHINESE MULBERRY CAPABLE OF BEING PROPAGATED BY ITS SEEDS?

In our last number (at page 674,) we copied from Mr. Roberts' Silk Manual, the interesting letter of our friend Gideon B. Smith, Esq. who maintains the practicability of raising the Chinese Mulberry from seed, though he prefers propagating it by cuttings. No one is better authority on this subject, and we believe that to no one is our country more indebted for bringing into use this valuable tree, than Mr. Smith. We shall add below, a later piece from the author of the Silk Manual, and editor of the Farmer and Gardener, in

which is totally denied the truth of the assertion that seeds are unfit, or unsafe, as means for propagating this tree, because that the seedling plants will vary from the parent stock, like seedling apples. We were the first to make known this European opinion, (in an article translated for the Farmers' Register,) and deeming it both true and important, we have frequently endeavored to impress on those who were about to raise mulberry nurseries, not to trust to the seed of the Morus Multicaulis. In this we certainly had no private interest to serve, either direct or indirect, to which influence Mr. Roberts attributes the objections of some persons to the use of the seed. We have presented before, and shall again, in the following piece, opposing views, as freely as our own—and we should be highly gratified if our brother editor and esteemed fellow-laborer in this cause, can maintain his position—which would be the means of introducing this valuable plant far more rapidly and widely, than merely by the use of cuttings. But though the evidence of Mr. Smith and Mr. Roberts, completely establishes the fact, that the true Chinese Mulberry has been sometimes obtained from seeds, yet we still believe, that in other cases, (as in the Italian experiments,) the contrary result has been found. It may then be believed, that like peaches, the seeds sometimes produce fruit similar to that of the parent tree, and sometimes quite different. Therefore it will be proper and desirable to try the seeds of the Chinese Mulberry, not only for more rapid propagation, but for acclimating the kind in colder regions: but it seems that it would be unsafe to rely on that mode as certain and undoubted. We hope that those who have the facilities will make many more experiments on this interesting question, and be soon enabled to remove all existing doubts and difficulties.

From the Farmer and Gardener.

ON THE PROPAGATION OF THE MORUS MULTICAULIS, OR CHINESE MULBERRY BY ITS SEEDS.

In our 38th Number, after stating the fact that the seedsman of our establishment had failed in obtaining seed of this valuable tree from France, we expressed the hope that the nurserymen throughout the United States, would appropriate the largest of their trees to the purpose of raising seed. Since which we have seen several intimations that the seed of the *morus multicaulis* would not produce a tree like its parent. However sincerely these fears may be indulged in, and we do not doubt they are sincere, we do not believe that they were well grounded; indeed, we do know from the best authority, that the seed of the *morus multicaulis will* produce its *like*; and why should it not? Is it not as distinct a species of the mulberry, as the black, red, or white, or any other? Does not the seed of each of these produce plants identical in all their characteristics with their respective originals? No one will doubt this, because there are a million of witnesses to prove the fact. Then why should we withhold the possession of a like capacity from the morus multicaulis? Is it because the demand is great, price high, and policy might indicate the propriety of keeping up the idea that they cannot be propagated from the seed? The tree is a stranger of some 8 or 9 years standing in our country, wholly unknown to ninety-nine hundredths of our population, and of course the chance of keeping up the delusion that the seed will not produce its kind, is a good one. But the fact stands opposed to the assertion; for trees, the same in every particular, have been raised in this city from seed grown also in Baltimore. If the demand for the trees could be supplied by the means of propagation used at present, then no necessity for a resort to seed would exist; but when the increased and increasing call for the plant, from all directions of our country cannot be met, and there is no likelihood that the supply for ten years, in the old way of cuttings and layers, can be made equal to the consumption, we hold it that duty and patriotism alike point to the course we have suggested. The prosperity of a whole country should not be retarded in its march by any considerations of personal aggrandizement—the growth of a great staple commodity should not be held in check to gratify the cupidity of any set of men.

There is no necessity for sending to China for seed, if our own people are guided by a proper spirit of patriotism. We have the tree here—it has borne fruit, and from that fruit plants of the genuine morus multicaulis kind have been vegetated. What more is asked? Why then should the modes of propagating be confined and limited? Why should not all the mediums of multiplying the plants be resorted to? The seed can be sent by mail, and the tree can thus be made to reach districts of our country that there are no means of sending either cuttings or trees to; and if there were no other reason, that should operate to produce the measure we proposed.

We should really like to know what is meant by those who speak so feelingly through their fears, when they say that it will not produce its like. Do they mean that it does not produce fruit precisely the same as the parent tree? or do they mean, that it will not produce a tree bearing that fine, ample, silky leaf, as large as a plate, for which it is so highly valued. If they mean the former, we reply we care not what the fruit may be, it is the leaf that the worm consumes. If they mean the latter, we meet them at once with a flat denial; and we affirm, that it will produce that large and luscious foliage upon which the silk worm so delights to banquet, and from which such beautiful, glossy, and elastic silk is made.

If we had any doubts as to the morus multicaulis withstanding the severe frosts of our winters, which we have not, for if planted on a high, dry, sandy or gravelly situation, well protected, it is competent to live as long as any other tree. We say, if we had any doubts upon this head, we would resort to the propagation of the plant for seed with the view of accommodating it to our climate, for the experience of the world has long since proved that it is practicable to make the offspring raised in a country grow and survive the ills of climate, even when the parent of exotic origin, could not exist at all. The operation of this principle is not confined to the vegetable tribe; it is equally existent with regard to man—it is the universal law of nature by which the springs of life are regulated.

From the Silk Culturist.

ANOTHER EVIDENCE OF CHINESE MULBERRY PRODUCED FROM SEEDS.

Mr. Editor.—Dr. Eli Ives, of New Haven, has in his garden three *seedling* Chinese Mulberry trees. In the summer of 1833, a small Chinese Mulberry tree in his garden, then, I believe, in the second year of its growth from the slip, produced one berry, which ripened. This was planted in August, and the same season produced the three trees I have mentioned. They have now endured two winters—are four feet high, were very slightly injured by the last winter, and show wood which is well hardened and perfect to the tips of the twigs. The trees raised from slips, though standing within a few feet, were severely injured by the last winter, and show wood which is green, succulent, and badly matured.

I have seen it suggested, that seedling Chinese mulberry trees would prove more hardy than those raised from slips, and I communicate this fact, as tending to confirm that opinion—and also to correct what seems is an erroneous impression, that this tree cannot ripen its seed in our climate.

I am, sir, yours, &c.,

H. C. BEARDSLEE.

Monroe, Oct. 5, 1835.

From the Ohio Farmer.

ON SPAYING COWS.

I have seen several pieces upon the subject of spaying cows lately, and as they performed the operation somewhat different from what I do, I will state what is my practice.

I make a soft rope of hemp which I fix at each end of a crooked piece of wood, like the one used for spaying hogs, only larger. These ropes should be long enough when doubled, so as to form a slip knot, to go over the hocks of the cows and heifers intended to be spayed, and they should be fixed on, and the heifer suspended by means of a sweep, until only the head, neck, and shoulders, rest upon the ground.

I then, with a crooked pair of sheep shears, shear the hair off the belly, just below the udder, (as they hang) large enough to get my hand into, and I then introduce my hand and carry it back to the back bone, and raise my hand until I find the ovary, which I draw out and cut away, not only the ovary, but all the fallopian tube, taking it off close by the horns of the womb. Cutting close, will prevent the cow from going into heat. After I have taken them out in this way, I sew her up with a common spaying needle, but instead of thread, I use buckskin or sheepskin. The advantages of skin instead of thread is, that it is absorbed and does not irritate the parts, like thread. One case that I examined eight days after the operation, was healed and none of the stitches left. I then apply a little hogslard in which there is a small portion of tar, to keep off the flies, if at a season of the year when flies are troublesome.

I prefer performing the operation in the fall or spring. I have spayed them, from eight days old to three years; and have spayed some that were with calf, not being apprised of their situation, until I had opened them. They cast their calves in a few days, and recovered as soon as the others.

I have also spayed them in the side, but find it more troublesome than spaying in the belly; though, after the operation is performed, I have always thought that those spayed in the side, were less liable to accidents than those spayed in the belly. I once had a heifer whose guts came out in consequence of the slipping of a knot. Had such a thing happened with one spayed in the side it would have been of no consequence, as the guts would not come out, if half the stitches were taken out.

The heifer alluded to, was thrown, and the bowels returned, and she recovered. When I first began to spay, (about 10 years ago) I sewed them very loose, according to the instructions I had received—but am now convinced that it is best to sew them moderately tight.

I have usually spayed from twenty to twenty five a year, and my loss has been about one in a hundred.

I have never spayed milch cows with a view of keeping them to their milk, for this can be easily done by keeping the cow from the bull, and always milking all that can be got from the cow, and feeding her well.

The demand for blooded cattle is now getting so good, that I shall only spay the inferior heifers, whilst I find it more profitable to dispose of the best for breeders. Two winters ago, I had forty-five heifers, and selected twenty and kept them for breeders. The balance I spayed and sold this fall (then two years old past) for twenty eight dollars each.

I usually keep my heifers up a day without food before spaying, as it is much easier to spay them when empty than when full. In one case, where a heifer was very full, in opening her, I cut her paunch about half an inch. She got over the operation as well as they generally do. In sewing, I am very particular that the stitches should pass through the flesh inside (the peritoneum) of the belly, and where the animal is very fat, it is best to sew them twice—first the inside skin, (the peritoneum) and after cutting off the thread, (buckskin) sew the outside.

If you think that there is any thing in the above that will interest your subscribers, you can use it.

SAMUEL D. MARTIN.

For the Farmers' Register.

ON THE NECESSITY OF MAKING MANURE.

Charlotte County, Va.,
February 19th, 1836.

A deep and increasing interest for the Register, and of course the farming interest, excites me once more to pen a few lines for the columns of that paper; not that I am vain enough to think any thing that I can say or write will contribute much to the amusement or improvement of your readers—but hoping rather to effect more from the example of *making communications*, than any thing else, to stimulate others to the performance of contributing their mite of information for the "general welfare." With these views and feelings, the hasty remarks herein contained, are now submitted to the plan-

ters, farmers, &c. of this, my native state. But before proceeding farther, I wish to say a word or two in relation to a practice now becoming *fashionable*; for it is *fashion* alone that holds the reins, not only of government, but also in our domestic relations. For instance, you hear of a new implement in husbandry, used by a particular farmer; immediately, without examination, without knowledge, the tool goes the round of the neighborhood over which his influence is exerted; and the consequence is, that some half or three-fourths of those trying it are disappointed most sadly; some not understanding the nature of the tool, misapply it, whilst others, making a very imperfect trial, pronounce it a foolish and useless expenditure of time and money, curses the day of its introduction, denounces the inventor as an arrant impostor, and he who uses it, a downright fool. Again; the *fashion* is set, by some notable correspondent, perhaps of the Register, to sign his name, (in *propria persona*,) not thinking there are many persons so *blind* as believe every thing they may chance to meet with in print—especially if there is a responsible undersigner at the close of the communication. Well! the effect of all this, is to induce others to follow suit; and every man who makes a communication, is very careful to write at the bottom his name in fair and legible characters; some, no doubt, make this the *plainest* line upon the sheet: I will not say, the most *important* one. But let us see the effect of this fashion a little more. There are some men so constituted, that if they really believed or thought it would be known who the correspondent was, would suffer all the ink in Christendom to dry up before you could prevail on them even to make their ✕ (mark.) Well! we lose all such communicators; and many who come under this denomination, are as good and practical farmers as any the country affords. But to be out of the *fashion* is the thing looked at; for to all intents and purposes you had as well be out of the world as to be out of the fashion. It has, I believe, been recommended by some, not to publish anonymous pieces. Now, my plan is, to leave the fashions with the belles and dandies; let the old men and plain farmers go along as it best suits their feelings or inclinations. Sometimes you will meet with one going hand in hand with the dandies; but at the same time, believe me sir, his eye, if not his heart, is on some fair miss in her *teens*. I have made, on former occasions, a communication or so for your valuable paper—but did not subscribe my real name, (Simon Pure,) thinking that ———— was as well known ten miles off as Simon, and knowing the fact that some men would believe every thing they might hear from the old gentleman, whilst others would believe *nothing*—crying out "is not this the carpenter's son?" I concluded to "cast my bread upon the waters." I hope, Mr. Editor, that nothing in these expressions will be considered as having a personal bearing; for such a thing has not yet entered my thoughts—on the other hand, I thank every gentleman for his communication to your paper, whether his real name is attached to it or not.

The particular object of this communication is, to impress on farmers generally, the important idea in all permanent agricultural improvements of *making manure*. I do not pretend to offer any thing new on this part of my subject—but only to keep its importance fully in mind. What is the great object of labor? I answer, to *make much*, and as *much* as is practicable to make, consistent with religion and humanity. Now, how shall we do this? Most certainly by applying our labor on that soil which is at its highest degree of improvement, combined with the judicious application of labor. But there is little or no soil of that description in this region of the world. What then must be done? The answer is, *make it*. But if I were to attempt this, too little of the necessaries of life would be made to *live on*. Why then, make as much as you *can*, consistent with that view of the case. Be sure to *make manure;* for this is the only subject with which the soil can be enriched. Make it, whether from cows, horses, hogs, or sheep; from corn-stalks, wheat-straw, or hay; from clay, bones, or ashes; from blood, suds, or liquor; from peas, beans, or vines; from swamp, or bank; from fowls, or beast; from field or woods; from shell, or stone—*make manure*. Let this be your main object; for without it there can be no advancement of a permanent character in the soil. As for that kind of improvement which lasts but a day, "Simon" is of opinion that it costs more than it comes to. Ask yourself every Monday morning, how much manure was made last week? Can any be added this week? Do not wait for a wet time or a dry time; and of all times carefully avoid what is called "a *convenient time*." It comes so seldom, and is gone so soon, that but little is done in the way of making manure. Enriching land is like putting out money on interest; not however, at the poor pitiful rate of six per cent; but if well managed, it counts up to thirty-three and a third, sometimes, fifty per cent., and occasionally, like compound interest, doubles itself in a very short time. Now all who seek for riches, may rest assured that this is the way—I do not say the only way—for I know of some, who by speculation, trick, or contrivance, have been made rich in a day—but generally such persons soon become purse-proud, and neglect their near and dear relations, who perhaps gave to them the helping hand: not only so, "they forget the God who made them." A great deal has been, can be, and will be said as to the quality of this important article in good husbandry. Whilst it is admitted, that much depends both on the nature of the soil, and manure, as to its proper application, old Simon knows one thing—and that right well—few, or none of us make enough of any kind—that a still smaller number are sufficiently acquainted with the particular quality of manure in its various stages, degrees, &c., to say at what particular time it should be used, or in what particular way applied. I have used it moderately on different soils—clay, sand, mould, new and old, wet and dry—but never yet have I used it in any way that was not more or less profitable. Manure, like "marriage, is a good thing"—and, as my old friend "Abstinence" says, it is good both in "the positive, comparative, and superlative degree;" and I would not give a bawbee for that system which teaches otherwise.

One of the best manures, in reach of every man, I neglected to enumerate—that is, *attention;* attention to small things—it not only acts very quick, but it is of a permanent character, when properly applied. It is sometimes mild, some-

times very pungent, and much too often is applied with a slight, stingy, sparing hand. The great *desideratum* in the use of this article as a stimulant, is its time of application, which should never be deferred one moment when the ground is in order to work. Even in rainy days it may be used to much advantage. But let me here advise the reader of one thing—and that is, its *peculiar liability* to evaporation; and the only way known to the writer for guarding against this evil, is to keep it in active service; such at least, are the views of

SIMON PURE.

From the Southern Agriculturist.

HOOKS IN HORSES.

Sir—Although the best writers on the veterinary art do not recognize such a disease in the horse; your subscriber from Appling, in Georgia, and Commodore Porter from Constantinople,* each relates the almost instantaneous relief afforded to their sick horses, by the very common operation of cutting off part of the third eyelid; the one calling it, according to the Asiatic nomenclature, *bone eye*, the other to the vernacular, *hooks*.

These gentlemen, like many other persons, were deceived, and made to mistake the effect of cold, or of some other inflammatory state of the patient for a disease of itself—nothing is more common. I myself recollect five cases of tetanus which occurred in the summer of 1820, not one of which but would have been called a case of hooks by the advocates of that doctrine. The first was that of a gelding in my own yard, attended by the veterinary surgeon, Dr. Carver. A negro who was in the habit of cutting off the hooks, was anxious to perform the operation. I did not consent: the horse died of violent spasms.

The second was that of a stallion, belonging to Dr. Joseph Glover. Dr. Carver attended it and performed the operation for the hooks—the patient was cured.

The third was that of a gelding, the property of Col. Bryan. Dr. Carver attended this last case, and performed the operation; the patient died.

The fourth was that of a small mare, opposite to my residence; the operation for the hooks was performed in a very early stage of the disorder: this case terminated fatally.

The fifth was that of a stallion of value, the property of the late Major Manigault, whose tetanus was produced by the puncture of a nail in the foot; it was treated by an eminent surgeon, who exhibited opium in large doses, and saved the life of the horse. I saw the case, and assert that no hooks doctor would have left this horses' eyes untouched. Thus out of three cases in which the operation was performed—one was saved—and out of the two where no operation, one was also saved.

For better information on this subject, I quote from the *Preliminary Treatise to the Library of Useful Knowledge*, published in London, under the superintendence of Lord Brougham and others, the most scientific persons in Great Britain. The Treatise is on the objects, advantages, and pleasures of science, and attributed to the pen of Lord Brougham.

After having described the eye of the bird, the author says, at (p. 30.) "A third eyelid of the "same kind is found in the horse, and called the "*haw;* it is moistened with a pulpy substance "(or mucilage) to take hold of the dust on the "eyeball, and wipe it clean off, so that the eye "is hardly ever seen with any thing upon it, "though greatly exposed from its size and pos-"ture. The swift motion of the haw is given to "it by a grisly elastic substance placed between "the eyeball and the socket, and striking oblique-"ly, so as to drive out the haw with great veloci-"ty over the eye, and let it come back as quickly. "Ignorant persons when this haw is inflamed "from cold and swells, so as to appear, which it "never does in a healthy state, often mistake it "for an imperfection, and cut it off; so nearly "does ignorance produce the same mischief as "cruelty! They might as well cut off the pupil "of the eye, taking it for a black spot."

I should be glad if any thing I could say through the medium of your useful work, could prevent in any instance those two very commou, very cruel, and unnecessary operations on the horse—I mean cutting for the *hooks* and burning out the *lampus*.

JAMES FERGUSON.

Charleston, November, 1835.

From the Journal of the Franklin Institute.

ON THE DIMINISHED PRODUCT AND PROBABLE EXHAUSTION OF THE GOLD MINES OF THE UNITED STATES.

Extract from a review of G. W. FEATHERSTONHAUGH's Geological Report.

Mr. Featherstonhaugh states that "gold mining is yet in its infancy in the United States; in truth preparations for systematic mining are only now making."—(note to p. 9 of the report.) Persons most conversant with the subject are, however, I believe, unanimous in the opinion, that it has at least reached its full maturity, if, indeed, it be not already past its prime. The only description of gold mines as yet worked with any profit in this country, are those termed deposite mines; and if we look at the present condition of the gold districts in North Carolina and Georgia, where this description of mine has been most extensively found, we shall see that this opinion is not without foundation. In all the counties of North Carolina, south of the mountains, the mines have been worked, and nearly exhausted; in Burk and Rutherford counties, particularly in the latter, where the discovery of mines is of most recent date, there still remain deposites, which if worked with no greater force than that at present employed upon them, may last four or five years longer; and the portion of the Cherokee territory situated in the state of North Carolina, where it has been ascertained that the gold may be found, and in which the mines have been but partially worked, is of very limited extent, and its mines are not considered, by persons who have examined them, to be so rich as those in that part of the territory lying in Georgia. The deposite mines of North Carolina will, therefore, be of finite duration, and the quantity of their produce may be expected to

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* See American Turf Register for September, 1835, and your work for October, 1835.

sink gradually under the decline which they have manifested for the last two years.

The deposite mines in Georgia have, probably, been richer than those in any other part of what is called "the gold country;" but the minute division of property in that portion of the state where they were most abundant, occasioned by the injurious system of lottery, under which it was parcelled out amongst the good citizens of the state, and the high degree of excitement into which the public mind had been brought on the subject, occasioned extensive operations to be commenced simultaneously in all parts of the district, as soon as the right of property had been determined.

The extent of each gold lot was small, and the proprietors were eager to reap the golden harvest, by the prospect of which their expectations had been so strongly excited; the consequence of this was, that many of the mines, and some of them the best in the district, were worked out during the first year after the drawing of the lottery; but, so great was the number of adventurers who entered into this business, entirely ignorant of the first principles of mining, that it may be confidently affirmed that more money was lost than made, during that year, in the gold mines of Georgia.

This bad success greatly diminished the number of miners in the succeeding year, but, as those who persevered had acquired more judgement, and conducted their operations with greater skill, their labors were rewarded with better success, and the quantity of gold procured from the mines, during each of the two last years, has been as great as in the first year, and the profits of those engaged in the business more considerable. But this cannot last, and I have been recently informed by an intelligent gentleman, in whose opinion I have full confidence, that nearly all the deposite mines will certainly be exhausted in less than two years more. Some few persons, indeed, who, by their speculations during the drawing of the lottery, obtained possession of several lots, may have reserved localities on which operations may be continued for a longer period, and some of the mines in what are called the older counties, such as that of Mr. Richardson, in Habersham, being of larger extent, may have a proportionably longer duration; the beds of the Chestatee and Etowah rivers may likewise yield gold for a long time, but the annual supply from all these sources cannot be expected to be nearly so great as that which has been afforded during each of the last three years by the mines of this state. I have but little personal knowledge of the mines of Virginia, but by what I have learnt from the accounts of others, the deposite mines of that state have never been either numerous, or very productive. As, therefore, deposite mines are, from the very nature of their formation, and from the ease with which they may be worked, of short duration, in a country where the mining districts are of limited extent, and where the industry of a large population will always be directed to so alluring a pursuit, the hopes of this country for a continued supply of gold from its own resources, must ultimately rest on the vein mines, and it must be to these that Mr. F. alludes, when he says, "preparations for systematic mining are only now making." Now, I am sorry to differ with him in opinion, but I have seen many mines, of various metals, and in different parts of the world, and I never saw one in which more skill and science were evinced in the construction of the works for the reduction of the ore, or in the underground works of the mine, than in the gold vein mine near Charlotte, in Mecklenburg county, N. C., owned by a company in New York, and conducted for nearly three years by the Chevalier Rivafinoli, who was himself a scientific miner, and had under him officers, both natives and foreigners, of competent ability; yet the undertaking entirely failed, not from any want of system, or skill, but because the mine gave out, or became too poor to pay the cost of working. I could mention many other mines, both in North Carolina and Georgia, which at first gave great promise of success, and in which the works, though perhaps inferior to those at Charlotte, were constructed on principles recommended by European practice, but which have all failed from a similar cause. In consequence of these disappointments, vein mining for gold has been very generally abandoned, and I believe no other than the Capp's mine, near Charlotte, was in course of work at the close of 1834. As, during the last year, I have been less acquainted with the actual state of the mines than formerly, I do not know what may be the present prospects of the last mentioned mine, or whether any others have been opened in North Carolina, or Georgia; but the instances I have cited, sufficiently prove that the present low condition of vein mining in those states is rather owing to the poverty of the mines, and to their small extent in depth, than to the want of system, or industry, in their management. Mr. Featherstonhaugh says, "not one shaft has yet been sunk exceeding 160 feet;" a satisfactory reason to account for this is, that every mine, yet opened, has given out before it reached that depth. Several gold vein mines have likewise been discovered in Virginia, and the working of one in Fauquier county has been commenced by a company, which is proceeding with much spirit in the undertaking; it is to be hoped success will crown the efforts of its proprietors, but no reasonable conjecture can be formed as to their prospects, till they have reached the depth of from 100 to 150 feet.

These observations certainly militate against the conclusion, "that the progressive scale of production since 1824 warrants the most favorable anticipations for the future;" for, if they are correct, it may rather be expected that the produce of gold from the mines of this country has already reached its maximum, and is henceforward likely to decrease. According to a statement, which I saw a few days since, of the quantity received in the mint during the present year, 1835, it appears to be less than that received in 1834, by between twenty and thirty thousand pennyweights, and not to amount to more than one-fourth part of the three millions of dollars, predicted by Mr. F. as the produce of the year; and it must likewise be considered, that, in consequence of the advanced price given at the mint, under the new regulation of the value of gold, the proportion of the whole produce which now reaches that establishment, is likely to be greater than formerly.

In page 14 of the report, we find the following remark: "talcose slate is a mineral formation, in which the auriferous veins of the United States are found, the veins in some parts of the country,

passing through a field of talcose slate several miles in breadth, whilst in others they are sheathed only, as it were in the talcose slate, and pass through a field of elvan and granite rocks of various kinds." If by this assertion, it is intended to be implied that talcose slate is exclusively the repository of the gold veins in the United States, it is certainly at variance with general experience; that this formation is favorable to the production of gold, and that veins of that metal are frequently found in it, will readily be admitted, the mines of Virginia and some of those in Georgia are thus situated, but nearly all those of North Carolina and most of those in Georgia are found in a very different rock: and no instance, I believe, of a gold vein in granite has ever presenteded itself in this or any other country; the small quantity of gold found in Cornwall has always been obtained from the formation, known in that country by the name of killas.

Our author appears to be a believer in the exploded doctrine, that the formation of metallic veins is attributable to the ejection of mineral matter in a state of igneous fusion from the interior of the earth; should the capitalists of Missouri be induced, by a confidence in "the reasonableness of the opinion that metallic veins have their origin from below," (p. 10) to enter with more spirit into the business of mining, it would undoubtedly be a benefit both to themselves and to their country; but should this be their only inducement, it may be feared, that they will be discouraged in the pursuit, when they discover that the most eminent geologists in this and other countries consider that such a mode of their formation is far from being satisfactorily established; if such however is the opinion of Mr. F. he certainly has a right to express it, but as it has been a controverted question, some reasons for such a belief, more conclusive than his arbitrary dictum, would perhaps have been desirable in a work intended to be "permanently instructive."

Mr. F. does indeed refer to some circumstances in a subsequent part of his work, which, he says, "seem to point to a projection of mineral and metallic matter from below:" but, if we examine these circumstances we shall not, I think, find in them, any thing like an argument to support this hypothesis. That the flat or horizontal veins which he met with in the lead mines of Missouri, are "lateral jets from the main lode," cannot be doubted; but the position of the metal at the bottom of the cavities or pockets which he describes, is most satisfactorily accounted for by the supposition that it has percolated, whilst in a state of fusion, through the soft matter of the red clay; for the admission, that it was brought into this situation by a projection from below, would be a contradiction of his own theory of their formation.

From the Journal of the Franklin Institute.

REPORT IN RELATION TO A PROPOSED RAIL ROAD FROM THE RIVER OHIO TO THE TIDE WATERS OF THE CAROLINAS.

The committee to whom was referred the subject of a rail road from the valley of the Ohio river to the maritime coast of the Carolinas and Georgia, having in a general manner considered its practicability and advantages, beg leave to submit the following report.

The states which border on the Ohio, or are watered by its great tributary streams, are western or tramontane Pennsylvania and Virginia, Ohio, Indiana, Illinois, Kentucky, and Tennessee; nearly through the centre of which that river flows, almost parallel with the sea coast of the old southern states. From the seven states above mentioned, there are highways of communication with the ocean in but two directions—north-east, and south-west. The former, consisting of several distinct lines of river, canal, macadamized and rail road communication, reaches the Atlantic ocean between the west end of Long Island Sound and the mouth of Chesapeake Bay—from New York to Norfolk—a distance, on a straight line, of 300 miles. The latter communicates with the Gulf of Mexico by the delta of the Mississippi. Between these two points of marine connection with the interior, is a coast nearly 3000 miles in extent, constituting the sea-board of southern Virginia, North and South Carolina, Georgia, Florida, Alabama, and Mississippi, with which the states in the valley of the Ohio have no direct communication, even by means of a good post-road, so that the mail to the northern frontier of Georgia and the Carolinas, not three hundred miles distant from the banks of the Ohio, in a straight line, is actually sent by Washington City, on a route nearly four times as long. With that part of the southern coast which lies west of the peninsula of Florida, the Ohio states have ready intercourse, by the Mississippi river; but with the region east of that peninsula, they are destitute of all adequate means of commercial and social connection. Here then is a great desideratum, which can be supplied in no other manner than by the contemplated rail road.

Starting, perhaps from more than one point on the Ohio river, in the state of Kentucky, this road should stretch nearly south; and branching, when it enters the Carolinas and Georgia, to reach their tide-waters at several different places. Taking Cincinnati as a city intermediate between Maysville and Louisville, and Charleston as intermediate between Wilmington, in North Carolina, and Augusta, in Georgia, the road might be said, more especially, to connect Cincinnati and Charleston, and may for convenience in this report, take its length and designation from those cities. Starting from the former, or rather, from the opposite bank of the Ohio river, in Newport or Covington, it would traverse the state of Kentucky to the Cumberland Gap, near the south-western angle of the state of Virginia, then cross the state of Tennessee, and, ascending the valley of the French Broad, in North Carolina, arrive at Greenville, or some other point, in south Carolina, beyond the Alleghany Mountains, whence it may pass down to Augusta, in Georgia, by one branch, and by another more immediately to Charleston, in the direction of Columbia. In traversing North Carolina, it might with facility, the surface of the country permitting, be connected by a lateral road, with the projected Cape Fear and Yadkin railway, which passing through Fayetteville, is to terminate at Beaty's Ford, on the Catawba river.

The distance between Cincinnati and Charleston, on a straight line, is about 500, which would probably require a road of 700 miles. South Carolina, however, has already made a rail-way,

135 miles in length, to Hamburgh, on the Savannah river, opposite Augusta, nearly in the direction of Cincinnati; and the contemplated rail road to Paris, in Bourbon county, Kentucky, exactly in the course of Charleston, (for the construction of which there are, in the opinion of your committee, a great many weighty reasons of a local nature,) would have a length of about 90 miles, thus leaving but 475 miles to complete this new and most important communication, between the interior and the sea-board of the south.

The middle of this main trunk would be intersected by the projected rail road from Richmond, Virginia, *via* Lynchburg, to Knoxville, in east Tennessee, by which the Old Dominion would acquire a new channel of intercourse with her daughter Kentucky; and also with several of the states formed out of the north-western territory, which was once her property—travelling from the west to southern Virginia, being thus restored to the route which it took in the infancy of our settlements.

By an extension west, to Nashville, of the Richmond, Lynchburg and Knoxville road, the whole of central and north Tennessee would be enabled, with great facility, to communicate with the Carolinas and Georgia, by means of the southern extremity, and with the state of Ohio, by means of the northern extremity of the great highway under consideration.

From the maritime terminations, and the lateral branches of this extended trunk, let us turn our attention to the northern or continental connections which it would establish.

These would extend, both east and west, from Cincinnati, for several hundred miles, and through every intervening northern point. First, the Ohio river would connect it with western Virginia and western Pennsylvania—embracing the valleys of the great Kanawha, Monongahela and Alleghany rivers: Second, the Ohio and Erie canal, from Portsmouth to Cleveland, already finished; the Miami and Maumee canal, in progress from Cincinnati to Lake Erie, uniting at Fort Wayne with the Erie and Wabash canal of Indiana; and the Mad-river and Sandusky rail road, from Dayton to the Lake, the execution of which has commenced, would connect it with the entire chain of northern lakes, from the falls of Niagara to the Straits of Mackinac, and even Green Bay, on the western shore of Michigan, including the eastern border of Wisconsin Territory, north or maritime Illinois and Indiana, the whole of Michigan Territory, a part of Upper Canada, and the centre and northern declivity of Ohio: Third, the Wabash and Erie canal just mentioned, and the rail road from Lawrenceburg, at the mouth of the Great Miami, to Indianapolis, already begun, would carry its advantages into the depths of Indiana: Fourth, the Ohio river from Cincinnati to the Mississippi would connect it, beneficially, with south and west Illinois, Missouri, and the immense extent of unsettled territory watered by the upper Mississippi and Missouri rivers. Thus the proposed main trunk, from Cincinnati to Charleston, would resemble an immense horizontal tree extending its roots through, or into, ten states, and a vast expanse of uninhabited territory, in the northern interior of the Union, while its branches would wind through half as many populous states on the southern sea-board.

The extent of this inland communication from north to south, through the centre of the United States, would comprehend at least 15° of latitude, and could only be compared with that established by the Mississippi river. It would not indeed be limited by the continent, for, as many important islands of the West Indies are contiguous to South Carolina, they would, in fact, be comprehended in the new facilities of intercourse that would be established between the south and north, and should, therefore, be taken into the estimate.

Of the physical practicability of constructing the main trunk of the proposed rail-way, across the states of Kentucky, Tennessee, and North Carolina, your committee see no reason to entertain a doubt. It is true, that it must traverse many of the branches of the Cumberland and Tennessee rivers, and scale the southern extremities of the Alleghany Mountains. One of the branches, however, of the latter river, the French Broad, as we have already seen, originating on the slopes of the Blue Ridge, the most southern of the mountain chains, runs to the north, traversing the western angle of North Carolina, to unite with the Tennessee, thus opening a pass through a part of the mountains, and inviting to the enterprize. Of the height of the remaining mountains, your committee cannot speak with confidence, but believe it to be less than that of the Alleghanies, where they are traversed by the rail road and canals from Philadelphia to Pittsburg. However this may be, no decision of the question of physical practicability can be made, but by competent engineers, on an actual examination of the route.

The question of expense can of course only be settled by the same means. Assuming that the projected rail road from the Ohio river, opposite Cincinnati, to Paris, in Bourbon county Kentucky, will, from the considerations limited to the region of country concerned, be most certainly executed, and referring to the actual completion of the rail road from Charleston to Augusta, the intervening section would not, as we have seen, exceed 475 miles, which, at the high price of 12,500 dollars per mile, would amount to 6,000,000 of dollars; a sum not greater than is about to be expended by a company of capitalists, in the construction of a rail way within the state of New York, to run nearly parallel with her grand canal, and connect the same waters with the same city.

It may be said, however, that the central part of the Cincinnati and Charleston road would run through a country but thinly inhabited, and furnishing little aid, either in the construction of the road or in swelling the amount of transportation upon it. But why is it so sparsely peopled. Manifestly, in part, because of all portions of our common country, it is the most inaccessable and the most destitute of facilities for the exportation of its iron, salt, coal, tar, turpentine, and other natural productions. To wait, therefore, for a denser population, as a condition for commencing a great work of internal improvement, which only can augment that density, would be to wait for the developement of an effect, before resorting to the only cause that can produce it. Let the road be executed, and an instantaneous impulse will be given to improvement in that region. If, however, it were too steril for such a result to occur, no argument against the project could arise from that

fact, for the undertaking is necessary to the reciprocal exchange of the productions of the states penetrated by its extremities, in which respect it would be similar to the Philadelphia and Pittsburg route, which, in a part of its course, passes over uninhabited mountains, and still facilitates an immense trade between the east and west.

Thus it is not necessary that the whole line of an artificial way should lie through a cultivated and populous country, nor need we look to the inhabitants along this or any other projected rail road or canal, for the means of its construction. These will be furnished by the capitalists of any and every part of the country, or even by those of Europe, the moment the enterprize is authorized by the states through which it is to be carried on, and the probabilities of a profitable investment are rendered manifest. In the opinion of your committee, the states of Kentucky, Tennessee, and the Carolinas, might, in their sovereign capacity, execute this work, and make it a rich and lasting source of revenue; and, they have as little doubt, that the incorporated joint stock companies would at once be able to command the requisite capital.

Your committee are of opinion, that the strongest motives exist for the immediate execution of this great work. At least half the people of the union, comprehending, in whole or in part, in East Florida, Georgia, South Carolina, North Carolina, Virginia, Pennsylvania, Tennessee, Ohio, Michigan, Indiana, Illinois and Missouri, are interested in its completion, as they would instantly participate in its advantages; and, as your committee believe, need only to investigate the subject, to be at once aroused to efficient action.

Would it pass, like the New York canal, or the projected rail road from Augusta, in Georgia, to Memphis, in Tennessee, nearly from east to west, and consequently combine regions which have similar climates, and identical productions, its value would be far less. But, as we have seen, stretching boldly from north to south, and, with the present and future public works of the states between the Ohio river and the lakes, establishing a high road of communication through nearly all the climates and varieties of soil, productions, and people of the United States, it would forever stand alone and conspicuous among the public works of the union, both in the kind and amount of commercial and social intercourse which it would promote.

The sustenance and manufactures of the corn states, from Kentucky to Michigan, would instantly pass along it to the southern consumer, of the region from Cape Florida to the Chesapeake Bay, avoiding all the delays, commissions, dangers of the river, and dangers and damages of a tropical sea voyage which belong to the Mississippi and Gulf route; and even much of the produce that might be designed for coasting or foreign exportation, would reach the sea-ports of South Carolina and Georgia, by the same channel, instead of going to New Orleans or New York. On the other hand, the tropical productions of the north east of Cuba, and of East Florida—their spices, sugar, oranges, lemons, and figs;—and the indigo, rice and cotton of Georgia and Carolina would, by the same direct route, penetrate, in a few days, the interior of the continent, and spread among the consumers, even to the shores of Lake Superior.

Some of your committee, indeed, incline to the belief, that the same channel would, at no distant time, become an inlet for many of the productions and manufactures of foreign countries; for commerce, as far as possible, should be based upon a direct exchange of productions and commodities. Thus the shipping merchants of Charleston and Savannah, might barter their cotton in Europe for manufactures required by the people of the states in the Valley of the Ohio, and exchange the same for their sustenance; the whole operation, both continental and marine, being performed without the instrumentality of any other money than that employed in defraying the expenses of transportation.

Of the amount of the business that would, at length, be conducted on this national high-way, the committee scarcely dare to speak. To them it appears of a magnitude, which they fear the meeting and the community at the present time would regard as extravagant and incredible. By the existing population of the portions of country, even now connected with the work, there would be a great amount of travelling and transportation; but the extent to which it would augment the population of the zone of country through which it would pass; the impulse to agriculture it would impart; the manufacturing establishments it would set up, and the lateral turnpikes, rail roads and canals it would suggest, to new districts of country, from the western slopes of the Alleghany Mountains to the banks of the Mississippi, from the sea to the lakes, would make it the parent of a great system of central internal improvement, and enable it to augment the amount of its articles of transportation to an indefinite degree. These immense pecuniary benefits, accruing to millions of people, should, of themselves, prompt those who are interested to an immediate attention to the work; but there are other and nobler considerations, which should not be overlooked.

No public work could contribute more powerfully to our national defence. Establishing a direct and rapid communication, between the northern and southern frontiers of the United States, separated, unlike the eastern and western, from the dominions of foreign nations by narrow sheets of water only, it would afford facilities for the transportation of troops, munitions of war, and military sustenance, from the centre to the borders, or even from one frontier to the other, with unexampled rapidity; thus favoring a concentration, requisite to national defence in the time of war, which could not otherwise be effected; and which would present a new triumph of civilization over barbarism, by making civil public works, an efficient substitute for standing armies and powerful navies, which exhaust the resources and endanger the liberties of a nation.

But the most interesting and affecting consequence that would flow from the execution of this enterprize, would be the social and political.

What is now the amount of personal intercourse between the millions of American fellow citizens of North Carolina, South Carolina, and Georgia, on the one hand, and Kentucky, Ohio, Indiana, and Illinois, on the other? Do they not live and die in ignorance of each other; and, perhaps, with wrong opinions and prejudices, which the intercourse of a few years would annihilate

forever? Should this work be executed, the personal communication between the north and south would instantly become unprecedented in the United States. Louisville and Augusta would be brought into social intercourse; Cincinnati and Charleston be neighbors; and parties of pleasure start from the banks of the Savannah for those of the Ohio river. The people of the two great valleys would, in the summer, meet in the intervening mountain region of North Carolina and Tennessee, one of the most delightful climates in the United States; exchange their opinions, compare their sentiments, and blend their feelings—the north and the south would, in fact, shake hands with each other, yield up their social and political hostility, pledge themselves to common national interests and part as friends and brethren.

Finally, the immense summer throng of visitors which annually go up to the north, along the sea board, would be made still greater, and turning westwardly through the states of Virginia, Maryland, Pennsylvania and New York, spread over the northern centre of the United States, to the shores of the lakes and upper Mississippi; concentrating on their return in the valley of the Ohio; having seen what they now never see and made acquaintance with what at present is unknown to them, the very heart of the Republic. On the other hand, the people of the north would, in autumn and winter, pour down upon the temperate plains of the south, in turn, studying their political, civil, and literary institutions, participating in their warm hospitality, catching a glow of southern feeling, gratifying their curiosity, and return enlarged in their patriotism and enriched in their knowledge of our common country. Thus this travelling, alone, would, at no distant day, reimburse the expenditures by which it be created, might while it would unite with the ties of business, in confining with a new girdle, states which are now but loosely connected, and thereby contribute powerfully to the perpetuity and happinesss of the union.

DANL. DRAKE,
T. W. BAKEWELL,
JNO. S. WILLIAMS,
} Committee.

Cincinati, Aug. 15, 1835.

NEW EXPERIMENTS ON THE MEANS OF PRESERVING WHEAT FROM THE SMUT.

BY M. MATHIEU DE BOMBASLE.

Translated for the Farmers' Register, from the *Annales de l'Agriculture Francaise.*

I commenced in the fall of 1831, a series of experiments having for their object to investigate the best means of preserving wheat from the smut, which often causes to agriculturists very considerable losses in their harvests, and besides injures the product so as greatly to diminish its value. I have continued these researches during four years, subjecting to my experiments the means, till now regarded as most efficacious, together with a great number of others. Each year, I devoted myself to new trials with the design to settle some doubts which the results of my former experiments left in my mind. I have at length come to a conclusion which I may consider as perfectly satisfactory, and I may announce that hereafter it will be easy for all cultivators to obtain with certainty, by the aid of very simple means, crops of wheat entirely free from smut. I have already published some details relative to my experiments of the two first years, and I shall now give an account of those, the results of which have been established by the harvests of 1834 and 1835. I shall precede this statement by a summary of the experiments of the two former years.

The most remarkable results of my first years' experiments observed in the crop of 1832, were these: lime and common salt employed separately offer very inefficient preservatives; but by combining these two substances in certain proportions, we obtain an action much more powerful for the destruction of the germs of smut; and this action is greatly superior to that of sulphate of copper, or blue vitriol, whether employed alone, or in combination with common salt, as is often practised. The sulphate of copper had been considered till then, according to the experiments of M. Benedic Prévôt, as the most powerful agent that could be opposed to this disease of wheat; and it was already an important gain to have discovered a more efficacious action in substances that may be placed without danger, in the hands of the agricultural population; for when we are aware of the heedlessness which attends all their operations, we cannot but be alarmed at seeing farm servants handle in considerable quantities, a substance so poisonous as sulphate of copper.

Besides lime, the sulphate of copper and common salt, I subjected to my experiments in this year, potash, the sulphate of iron, and sulphureous acid; employing these various substances either separate, or combined with each other in different manners, and in different quantities. Many of these preparations were completely inefficacious; some of them were more or less injurious to the germinating faculty of the wheat itself—and for those which showed some power as preservatives from smut, it had been necessary to employ the process of steeping, to obtain a somewhat efficient action of the preservative agents; that is, it had been necessary to immerse the grain in the solutions of the different substances, and to let it remain there in maceration a longer or shorter time. It has been long known that this plan gives great effect to the preservative agents, and Arthur Young considered it necessary, from the result of his experiments, to let the grain remain for twenty-four hours in water, impregnated with lime. Mr. Bosc, in the article *Carie*, in the new '*Cours complet d'agriculture*,' presents the same indication from the result of the experiments of M. Tessier. I will observe here, that in the same article, this author, proceeding by theoretical analogy, attributes to potash a preservative faculty as powerful as to lime, while, according to my experiments, carbonated potash, as it is found in commerce, exerts no action whatever on the smut. In the same manner M. Bosc, relying upon the theory, prescribes, as superfluous, the mixture of common salt, or of any other salt with the lime; whereas the facts prove that this mixture exerts an action incomparably more powerful than either of the substances taken separately. So true it is, that, in every thing that relates to organized bodies, the facts themselvs must be consulted, and not scientific theories or analogies.

The following year, in a series of twenty-seven experiments I continued to subject to proof in various combinations, lime and common salt, and I added to these carbonate of soda, combined in different proportions with the lime as well as the *chlorure* of lime employed alone in solution, and in divers proportions, and the hydrochlorate [muriate] of lime. The results confirmed perfectly those of the preceding year; as to the efficacy of the mixtures of lime and common salt employed for *steeping*, they showed again, that lime employed alone by sprinkling has little effect, and that the hydrochlorate of soda [common salt] and the hydrochlorate of lime have scarcely any, nor has the *chlorure* of lime. Besides I did not succeed in obtaining from any of the agents employed a sufficiently powerful action without using the steeping process; and as I was much interested to discover a preservative means, by the more simple and easy process of sprinkling I determined to pursue my course of experiments the following year. In fact, those persons who have recommended the use of steeping for liming wheat, do not know how much trouble and difficulty this process occasions in country farming. This trouble is so great, that there is not, I believe, one farm in a thousand, on which the grain is limed by steeping; and every where the practice is confined to sprinkling, although it is well known that steeping is much more efficacious. I considered it then very important to find out a process by sprinkling, which should be at least equally efficient with the use of steeping, as practised by a very small number of farmers.

My experiments of the succeeding year, were therefore directed to investigate the efficacy which might be expected from agents applied by sprinkling. I subjected to these experiments, lime, the carbonate, the hydrochlorate, and the sulphate of soda, using the lime alone, in various proportions, with various modes of application, as well as combining with it each of the three salts in different proportions. The number of smutty heads in the sowing made of wheat artificially infected with smut, was five hundred and seventy, in a thousand. By sprinklings with white-wash of lime in different proportions, some of which were in enormous quantities, I succeeded with difficulty in obtaining a diminution of one-half in the proportion of smutty heads. In the beds sown with wheat treated with mixtures of lime, and the three salts which I have just mentioned, the proportion of smutty heads was still very great, and generally from two to three hundred in a thousand: from these I must except, however, a single one of the beds—the result of which, struck me forcibly; it had been treated with lime and sulphate of soda,* and it was ascertained that it did not contain a single smutty head. It was the first time since I had devoted myself to experiments of this sort, that I had obtained in the result, the complete destruction of the germs of smut in wheat infected to a very great degree, as was that which I used; for after treating the wheat in the preceding years even with sulphate of copper, or lime, aided by the process of a long steeping, there had still been from eight to twenty smutty heads in the thousand; and after treating it in like manner by steeping, with a mixture of hydrochlorate of soda, [common salt] and lime, the most efficient combination which I had till then met with; there were still found two smutty heads in the thousand. But here there was not one smutty head in more than twenty thousand that the square contained! Yet on the side of this one, and in the neighboring squares, I had beds treated with the same substances in proportions almost exactly equal to those of this exempt square, and they had given from two to three hundred smutty heads in the thousand. As I am in the habit of keeping exact notes of the most minute details of experiments of this kind, I examined these notes with care, and discovered that the square free from smut had indeed been treated with the same substances as the others, but with a mode of management a little different. In all the operations made with lime, and one of the three salts above mentioned, the infected wheat had been first sprinkled with a certain quantity of slaked lime, and mixed with care; afterwards the solution with which the experiment was to be made, was poured upon the wheat, and it was mixed again. By adopting this order, I could make the mass absorb a greater quantity of the solution—but in a single one of these operations, and for some unimportant reason, an opposite order had been observed; that is, the wheat had been first wetted with the solution; and when the mixture had been well made, the grain still wet, had been sprinkled with the same quantity of lime as the other. I had never at that time had any idea that this difference could produce any effect on the results; but this square, as has been seen, was the only one quite free from smut. On consideration, I concluded that when lime, or a mixture of lime with a solution, was first used, it might be conceived that the lime incrusts the surface of the grain so as to weaken the action of the other agents; while if the surface of the grain and the dust of the smut are first wetted with the solution, they are much better impregnated with it; and that the lime, coming after, modifies in some way the solution with which these bodies are impregnated. Nevertheless, however striking was the fact observed, this explanation was but a conjecture, which it was necessary to test by new proofs. Consequently, I made no publication of my experiments of that year, and repeated the course of them by new sowings in the autumn following.

In these experiments the same steps were followed as in those of the years preceding: a double *décalitre** of seed wheat was first artificially infected with smut: afterwards a piece of ground was divided, as equally as possible, into squares of 25 *metres* length;† separated from each other by paths one metre wide; and in each of these squares was sown, with the most minute care, one-half *litre*‡ of infected wheat, either in its natural state, or subjected to the various preparations intended to destroy the infection. This year, however, in order to make a nearer approach to the ordinary

* The sulphate of soda, is what is commonly known as Glauber's salts. Ed.

* The décalitre is equal to 2.2009667 gallons English, (or American,) or rather more than 2 and one-fifth. Ed.

† The metre is equal to 3.2808992 English, or nearly 3 and three-tenths.

‡ The litre is 1.760773 English pints, or a little more than 1¾.

circumstances of practical agriculture, I did not infect the wheat to as great a degree as had been done in the preceding years, in which the grains had been completely blackened by the dust of the smut. On this occasion, the dust was added only in a sufficient quantity to alter the color of the grains perceptibly to the eye, without making them black; only the extremities of the grains covered with down, were completely blackened; and in fine, this wheat was affected and injured by the smut to a degree greatly beyond what is ever met with in the markets, and was such as would never find a purchaser. This wheat thus infected, and sowed without any other preparation, gave, when gathered, a hundred and forty-three smutty heads in the thousand, whereas in the preceding years, the infection carried to a much higher degree had given from five to seven hundred. All the preparations of this year were made by means of sprinkling, but the liquid was applied first, and the lime afterwards as has been just explained.

Lime alone employed in this way, after wetting the grains with pure water, or white-wash; and in the quantity of from one to two kilogrammes* to the hectolitre,† presented the proportion of two, seven and twenty-four smutty heads in the thousand.

Lime,in the quantity of two kilogrammes to the hectolitre, first made into white-wash, with a solution of a demi-kilogramme of common salt, or hydrochlorate of soda,gave still two smutty heads in the thousand.

Lime, in the quantity of two kilogrammes, and common salt in a proportion which varied from five hectogrammes to two kilogrammes, the whole to the hectolitre of grain, but applied separately, first wetting the grain with the solution of salt, offered not a single smutty head in one case, and produced from one to three in the others.

Lime,in the same quantity as above, united with sulphate of soda also in the same proportions, and with the same mode of management showed not a single smutty head in the three squares which were subjected to this preparation.

This result as is seen, fully confirms that of the preceding year, and we have henceforward,in the use of sulphate of soda united with lime, a preservative means against smut,not only superior in efficacy to all those which have been known till now, but even of an efficacy which may be called absolute; since it did not leave a single smutty head in the four squares—in which it was used during the two years, and which contained together more than eighty thousand heads of wheat; and since,it has even completely destroyed the germs of smut in a sowing, infected to the extreme degree of that of the year 1833. This means so powerful consists in the use of substances of very low price, presenting no risk to men or animals, and with a mode of application the most easy, and least troublesome.

I will give presently, the details of the process of liming as it ought to be performed according to my experiments, reducing the quantities to the hectolitre, as I have done in the preceding notices: but some very important considerations ought to be first presented. From the commencement of my experiments I had ascertained that certain preparations, at the same time that they exert their action on the germs of the smut, tend also to injure,in different degrees, or even to destroy entirely,the germinating faculty of the wheat. This is a point to which certainly not enough attention has been paid up to this time, and of which no mention is made, I believe, in any of the writings published on this subject. It has probably very frequently happened that crops of wheat have been thin and unproductive, without a suspicion of the cause, which was to be found in a liming made in an improper manner. In the course of my experiments I have particularly remarked this injury to the germinating faculty of wheat in sowings treated with sulphurous acid, with carbonate of soda united with lime, or even employed alone either for steeping, or sprinkling. The same observation was made in sowings sprinkled with common salt and lime; when I endeavored to increase the efficacy of these agents by repeatedly wetting the grain thus treated with water during twenty-four hours. These observations induced me, in my experiments, to pay particular attention to this property of the agents employed as preservatives from smut, and each year the effects produced in this repect by each of the preparations made use of, have been ascertained with care, by means which it would be too tedious to specify in this place.

In a publication made last year, a distinguished agriculturist of the neighborhood of Paris, announced that he had entirely lost his sowings of wheat on large fields,from having, in liming it, diluted the lime with cows' urine, instead of the drainings of the dung-hill which he generally uses for this purpose. Many other similar facts have remained unobserved, or been known but to few persons, from the general reluctance of farmers to publish the results of their operations. In relation to the particular fact of which I have just spoken, I will say that it is quite common for farmers to mix with the lime and other mineral substances which they use for liming, different very strong manures,such as the liquids above mentioned, the dung of pigeons, or fowls, &c., &c. It is evident that, in the minds of the men who have adopted these means, the addition of such substances was designed to give greater activity to the vegetation of the wheat—at the same time, that the germs of the smut were destroyed by the lime, or other mineral agents; for it is not probable that any one could ever have supposed, that manures could, of themselves, destroy the principle of the smut; but the design which they must have had in this, is founded in ideas entirely erroneous as regards the nutriment of vegetables. In the first days which succeed the developement of the germ, the seed itself furnishes the only nourishment which can support the germ, and this nourishment consists in principles of a particular nature, formed in the seed, to accomplish this object. Art has never yet discovered any substance which can substitute the kind of milk that is produced in the seed, at the period of germination; and if we would subject to experiment all the preparations which have been pointed out to give more activity to vegetation at this period, we should find them all inefficient or injurious. It is the radicle which is first developed,

* The kilogramme is 2.20548 pounds avoirdupois, or rather more than 2 and one-fifth.

† The hectolitre (100 litres,) is 22.009667 gallons—little more than 22 gallons,or 2 & six-eighths of a bushel.

and it has already acquired a considerable growth when the germs of the stalks rises out of it, to reach the surface of the earth, where it acquires a new developement, which enables it to respire the atmospheric air. Till this moment the life of the plant is altogether interior; it is the life of a *fœtus* in the womb of a mother, or in an egg. The animal fœtus can receive no nourishment from without, until its respiratory organs have been brought into contact with the atmosphere, and it is exactly the same with the vegetable kingdom. It is only at the period when the cotyledons are sufficiently expanded to absorb atmospherical air, that is, when they have acquired the green color of leaves—that the radicle is able to extract from the soil which surrounds it any nutritive substance; but at this time, the radicle is quite long, and has descended from one to two inches below the point, at which the grain was deposited in the soil. How could it be supposed that the minimum quantity of manure with which the seed was impregnated, could then be imbibed by the radicles which are unable to absorb any thing except by their inferior extremities? On the other hand, during all this time of its first growth, the young plant is very delicate, and may easily be destroyed by agents which might have served it for nutriment at a more advanced period of vegetation. Hence it is, that if oil-cake be spread in the same drill with the seeds of wheat, beets, buckwheat, &c. and the whole be covered with earth, scarcely any of the seeds will come up, as I have ascertained by repeated experiments. It was certainly by an action analogous to this, that the cows' urine, in the case just mentioned, produced such disastrous effects. The same agriculturist had formerly used in liming, without inconvenience, the drainings of the dunghill; but as this liquid may vary considerably in its nature, according to the age of the dunghill, and to the species of animal from which it is formed—and according as it is more or less weakened with water, or more or less concentrated, in consequence of rains, droughts, &c., &c. it might be very possible that employed under different circumstances, it would produce very bad effects; and, as mixtures of this sort can be useful in no way, I think it would be better to dispense with them altogether; and to employ only pure water as a solvent or vehicle of the preservative agents.

I shall conclude this article by giving, in detail, a description of the most effectual mode of liming, as established by my experiments. In my various operations, I have used the sulphate of soda in quantities, which have varied in the proportion of 1 to 4. As the germs of smut have been completely destroyed by the weakest as well as the strongest dose, or seeds infected to the highest degree—I shall here give the weakest as being sufficient in every case. I should say however, that in making use even of the greatest proportion, I have ascertained that this mixture has no injurious influence on the germinating faculty of the wheat.

Description of the process.—The sulphate of soda of which I speak in this place, is a salt which is produced in great masses in the manufacture of soda—and which may be procured at all the druggists' at a lower price than common salt; it is not at all poisonous; a solution of it in water will preserve its properties for a long time, and it may be prepared beforehand for the whole duration of the sowing season. As for the lime, it should be taken in lumps and slaked by the addition of the small quantity of water necessary to reduce it to powder, or dissolve it. It ought to be applied newly slaked, and if it is necessary to keep it for some time, it should be preserved from the contact of the air, by placing it in a barrel with the head out, and covered first with a linen cloth, on which should be spread, to the depth of a couple of inches, some substance in a dry powder, such as ashes, well dried sand, &c. Whenever any of the lime in powder is taken out, this covering should be immediately re-placed: if this precaution is not adopted, or is inconvenient, the lime should be slaked as it is needed, and that which has been slaked for two or three days, should be rejected. All these precautions are generally dispensed with, in the various uses of lime; because when it has been slaked, it preserves for a very long time the same exterior appearance; and to judge of it only by the eye, it would be supposed to be always the same substance; but in proportion as the lime absorbs the carbonic acid of the air, which is rapidly done, it loses its alkaline quality, and becomes as inert as powdered chalk.

The sulphate of soda should be first dissolved in pure water, in the proportion of 80 grammes to the litre, or 8 kilogrammes to the hectolitre: as this salt does not dissolve readily, it would be well to perform this operation the night before, shaking the liquid repeatedly till the salt is well dissolved. The grain to be limed should be placed in a heap on a floor of mortar, flag-stones, or level pavement; it should be watered by means of a common watering pot, and at the same time workmen, furnished with shovels, should mix and stir up the grain rapidly. The watering and stirring should be continued till all the grains are well wetted over their whole surface, and until the liquid begins to flow away from the heap, which indicates that the grain can receive no more: this operation absorbs about 8 litres to the hectolitre of grain; but it would be useless to measure the liquid, and it is sufficient to observe the rule just given. As soon as enough of the liquid has been received, and while the grains are still quite wet on their surface, the lime in powder is immediately sprinkled, stirring the mixture briskly all the time, and lime is added till it reaches the proportion of two kilogrammes to the hectolitre of grain. When the mixture is complete and all the grains are equally covered with lime, the operation is finished, and the seed thus prepared may either be sown immediately, or kept for several days. As it has not imbibed as great a quantity of water as it does in the operations performed by steeping, it is not necessary to spread it out in thin layers, and it may be left in the heap without danger of heating: it is however advisable to turn the heap over every three or four days.

The quantity of lime that I have directed does not require a great degree of exactness, so that the trouble of weighing, every time the quantities used, may be dispensed with; it will be sufficient to ascertain, by weighing once, the quantity contained in any vessel convenient for this purpose, for instance, a porringer, or some such thing; and the same vessel may be always employed as the measure of the quantity of lime for each operation. Such a vessel should always be provided before hand, and the lime should be prepared and ready for use; for it is very important that this

should be sprinkled upon the grain at the very instant it is wet upon the surface, for if a delay of some minutes should occur in sprinkling the lime, the solution would be previously absorbed by the substance of the grain, and the lime would no longer act in the same manner.

If this method is pursued with the precautions that I have directed, wheat infected with smut, to the highest degree may be confidently sown, with a certainty that it will not produce a single smutty head, at least in consequence of the disease of the seed. Some persons believe that smut may still be introduced into the crop from other causes; for my part, none of the facts which I have been able to observe, either in my agricultural practice, or in the course of my particular experiments on this subject, authorize me to subscribe to this opinion; and I am inclined to think that the facts upon which it may have been established were the result of an imperfection in the mode of liming hitherto employed.

From the Veterinarian.

NEW FACTS IN PROOF OF THE ADVANTAGE OF SPAYING MILCH COWS.

By M. Regere, M. V., Bordeaux.

Several instances have been related in your journal of the good effect resulting from the spaying of milch cows. I would beg leave to add some cases which have come under my own observation. The cows were taken from the best dairies, but, for obvious reasons, I selected those that had met with some accident at the time of calving.

Case I.

A large cow, fifteen years old, had calved on the 24th of January, 1834, and had, a few days after parturition, given from three to four gallons of milk per day. On the 22d of April following, she yielded only two or two and a half gallons. I then operated upon her. The pain of the operation, and the restricted diet to which she was afterwards subjected, diminished the produce to half that quantity.

As soon as the consequent inflammation had disappeared, and the cow returned to her usual food, the flow of milk rapidly increased; and, in fifteen days after the operation, the wound having healed, she yielded daily from two to two and a half gallons, and that quantity has not since diminished. She has also taken on a disposition to fatten, and is in better condition than she ever was before. She has once shown a desire for the bull, but was not sent to him.

Case II.

A small cow, six years old, calved on the 26th March, 1834, and at that time yielded two gallons and a half of milk per day. On the 30th of April she gave two gallons, and she was then spayed. She suffered little from the operation; her milk did not diminish. and she yields the same quantity to the present day. She has not shown any longing for the bull.

Case III.

A little cow calved on the 12th of April, 1834. Some days afterwards she yield two gallons of milk per day, and she was operated upon on the 13th of May. She seemed, for a considerable time afterwards, to be in a poor state of health; her skin became yellow; the hair fell off in patches, and particularly about her four quarters. She moaned sadly from time to time, and her appetite considerably diminished. The quantity of milk remained the same.

On June 20th she seemed to be really ill, and yielded, during seven days, little more than a gallon of milk per day. The quantity gradually lessened after that period, and continued to decrease until the end of July, when she was evidently dropsical. She was sometimes better and sometimes worse, until the 4th September, when she died.

Two pounds of a bloody serosity were found in the thorax. The lungs contained numerous tubercles; some hard, and even stony, and some soft, and others filled with purulent matter.

On opening the belly it contained, at least, seven gallons of a similar fluid. The fourth stomach and some of the intestines were softened and black, and the food contained in the first stomachs was fetid. The liver, enlarged and yellow, was softened, and it also contained many tubercles, hard or soft.

The womb was unaffected, except the extremities of the two cornua, which were of a yellow color, and hard. Few traces of the operation of spaying remained, unless in the sublumbar region, in which a spot of a blackish color was seen where each ovary had existed. A white tenacious tissue had united the incision made through the abdominal muscles, and caused the parietes of the abdomen to adhere strongly to the skin.

This examination after death proved that the cow was not lost from any morbid consequence of spaying, but from ascites, produced by the lesions stated, and which had existed before the operation.

Cases IV and V.

Two cows were operated upon in the month of May of the same year. One eight years old, and giving two gallons of milk per day, and that had calved on the 10th of April, was spayed on the 8th of May. She suffered from the operation, and did not give more than two or three quarts per day; but she soon recovered, and when the wound was healed, yielded her usual quantity, and which she continues to do unto the present period.

The other aged ten years, and that had calved on the 15th of April, and gave, a month afterwards, nine quarts of milk per day, was spayed on the 15th of May. In four days after the operation she gave again her usual quantity of milk; this increased to ten quarts, and she yields that unto the present day.

These cows showed a disposition for, and went to the bull several times after the operation; and, being incapable of conceiving, the œstrum [or heat] returns on them periodically. The first has been with the bull four times, and the other twice.

These five cows have continued to yield the

same quantity of milk which they gave at the time at which they were spayed; and this, on a fair calculation of the usual gradual diminution of the secretion, is double the amount that would otherwise have been obtained in the whole period. We must not yet go farther than this, but if cows that have been spayed should continue to yield such an extra quantity of milk as long as they live, the operation will be valuable indeed.

SKETCH OF THE PROGRESS OF AGRICULTURE IN VIRGINIA, AND THE CAUSES OF ITS DECLINE, AND PRESENT DEPRESSION.

An address to the Historical and Philosophical Society of Virginia, by EDMUND RUFFIN.

Prepared by request of the Executive Committee, for the Annual Meeting, in February 1836—and by resolution of the Society, ordered to be published in the Southern Literary Messenger, and the Farmers' Register.

Though fully sensible of the honor conferred on me by the request of the Executive Committee of this Society, to prepare an address on agriculture, it is with reluctance that the effort to comply is made—and nothing would have induced the attempt, but the fear that my declining the performance, would be attributed to any but the true motive. Heretofore, I have been accustomed to treat of such subjects as needed only to be rendered intelligible—of which, the manner and style were of far less importance than the matter conveyed—and for which a plain and even rustic mode of expression was not altogether inappropriate and inexcusable. The task now imposed on me requires abilities of a different and higher order; but still, for its execution, no aid will be sought in the grace and beauty of language. Being sensible of possessing no powers to draw from these sources, the fruitless attempt will at least be avoided.

But if no difficulty of this kind existed, others would be presented in the vast field embraced by the subject, and the impossibility of compressing it, or of doing justice to even any one distinct part, in an address as concise as the occasion requires. It is necessary to choose some limited portion only, for consideration: and therefore, my remarks will be confined to a hasty view of the progress of agriculture in Virginia, and the most efficient causes of its depression, and continued decline. Even for this detached portion of the subject, far more time and space would be required than this occasion will afford: and scarcely more can be presented than a copious table of contents—or the mere outline of a picture, which will be left for others to fill up and complete.

In a sketch so rapid, it is impossible even to name the many incidents and changes which government caused, during the early times of the colony of Virginia. These however would furnish many matters curious and interesting to the reader of history, or useful to the political economist, as illustrations of the effects of legal mis-directions of industry. [A.] Afterwards, when separate individual rights in lands were fully established, and the direction of industry was no longer materially influenced by law, nearly the whole agricultural labor of the country, and for a long series of years, was given to the culture of tobacco. In Europe, tobacco has never been raised in perfection; for however luxuriant the vegetation, and abundant the crops, the peculiar flavor which gives value to the product, has been always found deficient. This inferiority is certainly not owing to want of sufficient heat, or to any other defect of climate, in every region of Europe—and therefore, I infer that is caused by a general difference in the constitution of soil. Perhaps the deficiency of calcareous matter in the soils of Virginia, and generally also of her sister states, and its more usual diffusion through the best lands of Europe, have caused this one difference in our favor—a superiority however, of which the effect, as well as the cause, is subject for regret, rather than rejoicing.

Until times comparatively recent, there was but little skill used, (or required by purchasers,) in the tillage and after-management of tobacco. Steady and regular work, and nearly all of it of one kind at each separate period of the crop, occupied all the laborers on a plantation—so that but little intellect was required, either to execute, or to superintend, the several processes. The clearing of woodland engaged the labor of the whole force, every winter, and for months together, all at a time under the eye of the supervisor. The tillage was mostly performed by hand labor, because (under the existing circumstances,) it was cheaper than the extended use of the teams and expensive implements, and the accompanying varying and dispersion of labor, which belong to the most improved and perfect husbandry.

During the time of general tobacco culture in Virginia, there was no thought of increasing products by enriching the soil. New clearings of forest land were the only means used, both for extended tillage and increased products—and each new piece of land was planted in tobacco as long as it was able to bear that crop, and then in corn, until reduced to such a state of sterility as to induce the owner to throw it out of cultivation altogether, to be recruited, by nature's care alone, under a new growth of trees. The amount of cultivation for corn was barely enough to feed the laboring force—and that also was carried on by nearly or quite all the hands being employed together, and in the same operations. This is nearly the same kind of tillage that is necessarily adapted in every new "planting" country, whether the crops be of corn, tobacco, cotton or sugar—and however rude and imperfect, and even impoverishing to the soil, may be such a mode of tillage, it was wisely adopted under such circumstances as formerly existed in Virginia. It was the existence of similar circumstances in still greater strength, which forbade the general use of the plough, and even the cart, on the sugar estates of the West Indies, and which still makes the hand-hoe almost the sole utensil on some of the cotton estates of South Carolina. The error consists in continuing such rude tillage after the circumstances which required it have ceased—and such has been the error probably in all the cases cited. In a new country, where land is cheap, and labor dear, it is good economy so to direct tillage that each *laborer* may be able to yield the greatest product, (without much regard to the land—) and also, in such manner that as little intellect as possible may be necessary in the operative class. This rude kind of culture, and the employment of slave labor, are well suited to each

other: and there can be no doubt, but that by the general use of slave labor, Virginia, while a *planting* country, was greatly benefited—and that her wealth and prosperity were greatly more promoted, than they would have been without slaves. Nothing will make the lowest class of laborers industrious, in any country, but *compulsion*—whether it be presented in the form of hunger and cold, or the power of a master. Where land is fertile and cheap, and the climate mild, and the necessaries of life attainable with little effort, more than half the laboring power of the country would be wasted in idleness, without the institution of personal slavery. It is this institution (though not so named,) that has made the rapid growth and prosperity of the *convict colony* of New South Wales a theme of admiration and astonishment—though the bondsmen were of the most worthless kind: and the recent destruction of slavery in the British West Indies will surely and speedily reduce these heretofore productive and flourishing islands to a worse condition than New South Wales would have exhibited, with a *free* population, composed (as her's was) of vagrants and felons. In every country of modern Europe, personal slavery has existed—and it has no where ceased, by operation of law or otherwise, until manifestly opposed to the interest of the masters. Long after its end in Scotland, and in comparatively a modern time, such was the state of poverty, idleness, and misery of a large portion of what ought to have been the *laboring* poor of that country, that Fletcher of Salton actually recommended the institution of *personal slavery*, as the best remedy for the evil. Yet the general poverty of soil of Scotland, and its severe climate, rendered it one of the most unfit regions for slavery—and Fletcher, however mistaken in this respect, was an enlightened patriot, and a true lover of liberty. These facts are some of the many proofs that slavery is not always a political evil—and that its cessation, even by universal consent, has not always been considered a blessing.*

*The biographer of Fletcher of Salton, though strongly disapproving many of his political opinions, and his devotion to liberty, which are treated as tending to the extreme of republicanism, still bears ample testimony to his talents and worth. The sketch of his life in the Edinburgh Encyclopædia contains these passages. "Andrew Fletcher, of Salton, was a statesman and patriot of the highest order; and though Scotland, his native land, was the chief object of his exertions, yet, wherever the love of country and of liberty prevails, he deserves to be remembered with respect and gratitude."——"Fletcher was endowed with high talents, great courage, integrity, generosity, and temperance. On the purity of his intentions as a patriot, the exertions and sufferings of his life form the best commentary. He was a most elegant scholar, and an accomplished orator. His speeches are remarkable for their plainness and energy—and form, by their brevity, a striking contrast to the wordy eloquence of the present day."——"His *Two Discourses on the Affairs of Scotland* were written in 1693, when, in consequence of some years of barrenness, a scarcity, or rather a famine, existed through the land, and occasioned the most severe sufferings to the lower classes. The author declares, that besides those who were scantily provided for out of the church [or charity] boxes, there were at the time when he wrote, not less than 200,000 persons in Scotland begging from door to door; 'and though' he continues 'the number of these be perhaps double to 'what it was formerly, by reason of this present dis-'tress, yet in all time there have been about 100,000 'of those vagabonds, *who have lived without any regard* '*either to the laws of the land, or to those of God and* '*nature.*' He tells us also, that when he considers the many excellent laws enacted by former parliaments, for setting the poor to work, *contrasted with their utter inutility*—when he considered farther, that *all the other nations of Europe* (Holland alone excepted) *groaned under a similar pressure*, he was led to believe that neither the cause nor the remedy of the evil had been discovered. As no such evil had been complained of by the classical writers of antiquity, *and as much poverty was the consequence, in Europe, of the manumission of slaves by their Christian masters*, he gravely supposes that the *existence of slavery was the cause of the comfort and industry of the lower orders* in former times. It will hardly be credited by those who are acquainted with his high notions of political rights, and his constant jealousy of the power and ambition of princes, that he proposes *reducing all those persons, and their posterity, to slavery*, by a solemn act of the legislature, that on the one hand they might be *compelled to work*, and on the other, might be *insured the necessaries of life*."

It is not in approbation of, or concurrence with, this remarkable opinion of Fletcher, that it is here quoted. That his view was erroneous, and that his proposed remedy would have been most impolitic, (without naming objections on other and higher grounds,) is readily admitted. But that such opinions should have been entertained, and zealously asserted, by one who so well deserved respect as a scholar, a statesman, a patriot, and a philanthropist, is enough to establish the fact that the abolition of personal slavery in Europe, and even in so inhospitable a region as Scotland, together with its undoubted advantages, was attended with many great and long continued evils to the community, and, more especially to the very class relieved from slavery. The evils of slavery, such as they are, bear most heavily on the master—and the evils of emancipation, on those who were the slaves.

But nothing in society can be considered as permanent; and the circumstances which make slavery beneficial are not exceptions to this general rule. These circumstances begin to change as the agriculture of a country becomes highly improved. In a "farming country," the dearness of land requires that the owner should especially economize that portion of his capital. Improved processes, and extended and varied culture, make it necessary to disperse the laborers on every farm, and greatly to vary their employments. Then mental power is no less wanting than physical force. The ignorant slave who could well and profitably wield the hoe or the axe, under continual supervision, and the ignorant director of the work, who had only to see that it was "kept moving," become equally unfitted for the new and more prefect operations—and if they continue ignorant, they will always remain unfit agents for operations which, if properly conducted, would be greatly superior in effect and in profit. It is for this simple cause, that loss, instead of profit, so often attends the introduction of improved systems of farming—and the blame is generally laid to the defects of the system itself, when it is altogether attributable to the unfit agents and means employed.

But though I dissent from the very general condemnation of the earliest and rudest system of husbandry in Virginia, no one more reprobates its

being continued beyond the proper time for a change to better farming. With the usual obstinacy of adherence to old practices, tobacco continued to be the principal market crop in lower Virginia, until the interruptions of commerce, which preceded and accompanied the last war with England, reduced the price to less than what hay sold for soon after, for the support of cavalry horses.* In this, as in other cases, political compulsion, more than reasoning and proper estimates of profit, drove us from the old general system of tobacco culture. It is now continued only in the middle and upper parts of Virginia; and the processes for its preparation for market have been there so greatly improved, that much skill and judgement are required, and are exercised, for the profitable management of the crop.

Wheat was long in taking its place as a large crop—and would have been longer, but for the very high prices, (sometimes $2, and even $2 50 the bushel,) caused by the general war in Europe. The crops were at first so foul with weeds, and the grain so badly cleaned, that such would not now be marketable. Then came the ravages of the Hessian fly, which diminished the quantity of the crops, as much as slovenly preparation injured the quality of the grain. But improved tillage, and greater care, have served to compensate all such causes of loss, and have made the wheat crop of Virginia, and of the James River lands especially, a most important item of the total agricultural products of the state. This culture, however, which was so difficult to be established on a proper footing on our lands the best adapted to it, was next, by blind imitation, extended to almost every farm, even though the least suited to wheat, by the composition of the soil. Some proportion of lime is essential to constitute a good wheat soil—and very little land in Lower Virginia, naturally possesses that proportion. Still, so much and so peculiarly are the tillers of the soil the creatures of habit and example, that the culture of wheat was long persisted in, in spite of frequent failures, and general ill success, on soils altogether unsuited. At last the season of 1825, so fatal throughout the eastern half of Virginia, did not leave enough of good wheat on many farms, to again sow the fields—and that circumstance, more than reasoning and previous experience, induced wheat culture to be abandoned on the soils least suited to it, and its place to be occupied by the then novel field culture of cotton.

Indian corn has always constituted much the greater part of the food of the people—and with its offal forage, the food also of our live-stock. Hence it is the most important crop for its abundance and value, though its great home consumption makes its export but of small amount.

Cotton, as has been already stated, was introduced but recently in Virginia, as a field crop—and its long previous disuse, and its now successful and wide extended culture, present another striking example of the slowness with which new truths in agriculture make progress. During the last war, when our coast was blockaded by hostile fleets, all the cotton that supplied the northern factories was conveyed through Virginia, in wagons, over the worst of roads, and sold sometimes even here at 37 cents the pound. None of us then thought of making it as a crop for sale, though neither our wheat, corn, or tobacco, would then bring remunerating prices. It had long been usual on almost every farm to cultivate a little "patch" of cotton for domestic supply—but such small culture is seldom otherwise than neglected, and therefore unprofitable—and thence grew the general opinion that it would be in vain to attempt the culture of cotton on a large scale. Since, it has become the principal market crop of several of our southern counties—and yielded fair comparative profits, even when as low as 10 cents the pound.

Still more slowly, after its first dawning, was a general system of good farming established any where in Virginia. Though there are now many farms that may vie with any in the world in good management, and profitable returns, (considering the difference of existing circumstances,) it must be confessed that over a large portion of our territory, the good farming which is founded on, and mainly consists in, economy of means and fertilization of the soil, has yet to be introduced. Much has been done for improvement, for profit, and as example, by many of our enlightened farmers—but a thousand times as much still remains to be done—and from the neglect of which, our country at large is losing, or wasting, continually and enormously.

Manuring, the basis of good farming, until a time comparatively recent, was almost entirely neglected—so much so, that the opinion generally prevailed that putrescent animal matters (the effects of which no one could avoid observing,) were alone worth being used for the purpose of enriching land. To the illustrious farmer and patriot John Taylor, Virginia is mainly indebted for the removing of this gross, but widely diffused error. From his writings, and from the practice of other still more successful, but less celebrated improvers of the soil, it became known that far greater resources for fertilization existed in the almost unlimited amount of vegetable matter. This was no more than was previously known to all well informed agriculturists: but a remarkable practice founded on that general truth was scarcely known in Europe, because inapplicable where land has been highly enriched, and the processes of agriculture have reached a high state of perfection, though most valuable in a region of poor and low priced lands, and where labor and floating capital are scarce. This is the "enclosing system," or the prohibition of grazing the fields when not under tillage, by which the land is enabled to manure itself by the decay of its own vegetable growth. This was a great step towards improvement, (on suitable soils,) even when the covering of the fields consisted merely of the natural growth of common weeds—and far greater was the benefit when clover was substituted, which furnishes the richest possible coat of vegetable manure. When this system is adopted on soils suited to clover by nature—or made suitable by the use of calcareous manures—and still more when the mysterious and wonderful aid of gypsum is added—the farmer has found resources for any amount of fertilization that his industry and intelligence will secure. As vegetables, especially of

* Immense quantities of common tobacco were sold at less than $2 the 100 lbs.; and hay of very inferior quality, from natural wet meadows on the writer's farm, was bought and shipped to Norfolk during the war, and sold there at $2 50, the 100 lbs.

the clover tribe, feed on, and draw their growth and substance from air and water principally, if they are left to rot on the soil, they return to it much more enriching matter, than they had previously taken up for their support. This vegetable manuring is in itself a vast source of fertilization —but may be greatly increased by adding, in proper manner, the rearing of live-stock, and use of prepared manures. The attention which has but recently been directed to the use of calcareous manures, has already been productive of signal benefits—and every year's experience will serve the better to establish the necessity for their application, and the immense profit thus to be obtained, on our soils that are so generally deficient in that ingredient which is essential to a high grade of value and productiveness.

The observer of the progress of agricultural improvement in Virginia, may remark that the introduction of almost every new and profitable practice has been caused by means that amounted to compulsion—and rarely, if ever, has a general change been produced by the clearest reasoning, if not attended by the pressure of necessity. Thus, it required long continued and ruinous low prices to stop the general and injudicious culture of tobacco in lower Virginia—and the almost total destruction of the wheat crop throughout an extensive region, to prove that it was altogether unsuited to the soil. We may therefore hope that there still remain great blessings, in other new kinds of culture, to be *forced* on our acceptance by some supposed calamity, but real good. Thus, sheep husbandry, (which now the *dogs alone* can effectually prohibit,) and silk culture, may possibly be established with profit; and by such or other similar means, a prosperous population may be renewed in the central region, where emigration seems now to threaten a wide-spread waste. If it was possible that such a *calamity* could occur, as that we should be entirely shut out from the rich lands of the west, we would be *forced* to learn the value of our own position and resources, and the immense profits to be obtained by remaining contented at home, and making the best of the advantages offered by the land of our birth.

I shall now state more particularly the several causes which are most operative in repressing the improvement, and serving to prostrate the interests of agriculture.

I. The first cause in order, though not in grade, of injury to agriculture in Virginia, is the continuing too long the early and exhausting, as well as rude system of tillage, which was necessarily and properly adopted when our country was generally in the forest state. The error of too long a continuance of this course, was not so important (as is often asserted,) as to have blighted agricultural improvement over all the state. If no other and greater errors had existed, this one, the result merely of want of information, would have cured itself soon enough, in every case, to prevent any serious loss to individuals, or to the nation. This error has not operated alone, but has been aggravated, and endowed with its evil power, by other errors, which will be named hereafter.

II. A very mistaken opinion has prevailed generally as to the improvable nature of soils—and this mistake has served to misdirect effort, and to disappoint, and render profitless, the attempts of the most energetic farmers to enrich poor soils. It is but a late discovery that nearly all the soils of Virginia, (and it is believed also of all the Atlantic States,) are singularly wanting in lime as a natural ingredient—and it is yet but little known, that without a certain proportion of that ingredient, all efforts to fix new fertility in soil are vain. As a consequence of these positions, the adding the ingredient which is wanting will be the more effective and profitable, in proportion to the previous deficiency: and if our tillage in general has yielded profit, under this great and remarkable defect, far more profitable must it be, after that defect shall have been removed. The ignorance of these important truths, is here and elsewhere one of the greatest obstacles to agricultural improvement. It is in vain to prescribe remedies for a disease, so long as its cause is totally unknown to the physician—and even if the only effectual remedy is found to be unattainable, it is better that the truth should be known, than to persist in a vain and profitless pursuit. But nature has not been niggardly in offering means for applying this remedy to the lands of Virginia. Large portions of the state are abundantly supplied either with fossil shells, or limestone—and recent discoveries give hopes that similar means may be found in, or cheaply conveyed to, much of the most destitute region. Geological surveys and investigations may add incalculably to the one benefit—and the new and great facilities for transportation offered by canals and railways, will perhaps as greatly promote the other.

III. A third cause of injury to agriculture, and one which acts upon and aggravates all other causes, is the total absence of every thing like agricultural instruction, whether practical or theoretical. If in any other great and complicated business, it was the universal course for capitalists to commence as undertakers without any knowledge of the theory or principles—and to engage operatives and superintendents who were equally ignorant of the practical details—and that for all to acquire the knowledge wanted, reliance was placed solely on their subsequent untaught operations—in such cases, every voice would pronounce that the business must inevitably result in bankruptcy and ruin. Yet such is the case, nearly to the letter, in almost every agricultural business in Virginia, whether on a large, or small farm. Of the former, the wealthy young proprietor is educated far from his future property, and receives instruction almost exclusively in dead languages, and sciences designed never to have any practical application to his future pursuits—and perhaps afterwards he adds thereto more or less of study, (on the pretence of it,) of law or medicine—and having arrived at manhood, he throws all aside to undertake the new business of farming. Still, a rare and admirable aptitude for the pursuit may sometimes enable a proprietor to overcome all the disadvantages of his own ignorance, and that of his agents, and to succeed in spite of such enormous obstacles. But because some few such cases are before us, it is a great and dangerous mistake to suppose that good farmers can be thus formed, in all, or in many cases. It would be as rational to infer that all education in literary and scientific institutions was unnecessary, because, without such aid, a Franklin could reach the highest station of celebrity and usefulness.

But however great may be these disadvantages

of the wealthy farmer, they are as nothing compared to those of the far more numerous class of men of small possessions, and of more limited education. The former has leisure, and various facilities to gather information from others. Travel, books, frequent and varied association with his fellows who are better informed, (or who even if alike ignorant, are alike striving to gain knowledge,) all serve to aid his improvement. But the small farmer who is confined to his daily toil, has no such means, and can rarely acquire knowledge from others, if surrounded by such as are in circumstances similar to his own.

So much for the proprietors of farms, and general directors of farming. But of necessity, all extensive and complicated operations must be under the immediate direction of agents—and in our farming, these agents, the overseers, are without any previous training for their business, and of course deplorably ignorant, even if not in other things deficient. This alone would present a sufficient cause for failure, even if the proprietor is not wanting in ability as a general director—unless indeed, (as is usually the case,) such capable proprietors are in a great measure their own overseers, or have to undergo the drudgery of their business, and attend to those details which properly belong to the care of subordinates. But however low our overseers deserve to be ranked, as a class, there have been among them a few distinguished exceptions—men, who however humble was the commencement of their career, have earned, and well deserve to enjoy, the applause and high respect of their countrymen in general. The distinguished place in society to which some such men have honorably risen, by their knowledge and success as farmers, shows that the reward of reputation, as well as of wealth, may be surely attained by such meritorious exertions.

This cause of the degradation of agriculture—*ignorance*—is more subject to the control of government, than any other—and therefore it is more important to dwell on its baneful influence, and to suggest remedies for the evil.

If agricultural professorships were established in our principal institutions of learning, young landholders who are there acquiring liberal educations might easily obtain a competent knowledge of the general principles of agriculture, without sacrificing the other useful parts of scientific instruction. If this object would not be a sufficient inducement to remain one more year at college, it would be an advantageous exchange in such cases, if the study of theoretical agriculture, and its connexion with chemistry and some of the branches of natural history, took up the time usually devoted to metaphysics and the higher branches of mathematics—the study of which will be of use to but few men, except as a good mental exercise—a kind of *gymnastics* for the mind. It will be easy to ridicule the agricultural instruction that could be acquired from the lectures of a professor—a mere man of books and of theory. But though it is freely admitted that no such course of instruction, *alone*, could make a farmer, yet it would be the best preparation for the future acquisition of practical knowledge. It would be folly to look to the lectures of a professor for instruction in practical operations: but we might expect them to furnish the general and true principles of agriculture and its kindred sciences, (so far as they are connected,) without some knowledge of which no man can avoid committing continual blunders, and meeting with continual losses, as a practical tiller of the earth. For example: a farmer cannot know whether he is proceeding right or wrong in the very important operations of preparing, preserving, and applying manures, without some knowledge of the chemical ingredients of the materials used, of the changes produced by fermentation, and of the functions of the plants which are designed to be fed, and of the composition and properties of the soil intended to be enriched. Even a *little* knowledge on these points would serve to guard against serious waste and loss on every farm—the total amount of which makes an hundred fold greater national and annual loss, than all the expense of agricultural professorships, and of every other means for instruction that I shall advocate.

Experimental farms, under proper direction, would also serve a most valuable purpose for increasing general agricultural information. But it would be a mistake, fatal to the object in view, if such establishments were expected to present a system of pattern husbandry, or even to yield any clear pecuniary profit whatever. Such expectations would necessarily be disappointed—and thus would cast discredit on the whole plan. Experiments, if judiciously conducted, and accurately reported, would be more effectual than any other means for conveying valuable information to the agricultural community. They *cannot* be made extensively by private individuals—for the plain reason that they require too much expense of time, labor, and money, and in general, are attended with loss, even when the results are most valuable for the information they give. A farmer might lose $100 by making a series of experiments, of which the results might be worth $100,000 to the community at large. Hence, it is in vain to hope for such proceedings, unless induced and supported by the funds of the community—and it is foolish to count on deriving direct and immediate profit from experiments, whether conducted by public bodies or private individuals. Yet this foolish expectation is very general—or at least it is commonly deemed sufficient ground to condemn and ridicule any experiments as worthless, if their immediate result is loss to the inquiring and public-spirited individual who instituted them. Yet who ever counted on deriving direct pecuniary profit from any course of experiments in chemistry or natural philosophy? And without many such costly and losing experiments, the world would not have obtained the benefits of the steam engine, of the machinery for spinning and weaving cotton, the modern processes of bleaching and coloring, and hundreds of other improvements in the arts. If judged by the test of profit, as usually applied to agricultural experiments, Watt and Fulton, and Arkwright, would have been pronounced mere fanciful schemers, if not fools, not only because of the expense of their experiments, but perhaps because neither of them could bring into operation the mechanical skill, and habits of business, necessary to the highest perfection and greatest profit of their splendid discoveries.

It has often been recommended, and by high authorities, that *pattern farms* should also be established, to teach agriculture by example. This I should strongly oppose—and for the reason that,

from necessity, what might be *named* a pattern farm, would prove to be any thing but an exhibition of good and profitable husbandry. Instead of attempting such an establishment, it would be better to make use of, as an additional course of *practical* instruction, the now existing farms of many private individuals, which are truly patterns of good and profitable management. Many such farms might be named, deserving this character, in various parts of Virginia. It is evident that no one of them, even if managed in the most perfect manner, according to its location, and the peculiar circumstances of its proprietor, could serve as a general pattern farm. But one, for example, might exhibit a pattern for clover fallow and wheat culture, on the singular and valuable "red land" of the Southwest Mountain slopes—another for the same, on the rich, flat loams of James River—another, would show the profitable combination of tillage and grazing west of the Blue Ridge—another, the best mode of tilling and enriching the more sandy lands of Lower Virginia—and all might accord in some common points of resemblance, in addition to the merit of excellent general management. The proprietors of such farms might very properly be considered as adjunct and practical professors of agriculture; and would render important services as such, by each receiving in turn, as pupils, two or three of the young men who had previously passed through the course of theoretical instruction. On these farms, and under such instructions, a young man could learn more of practical and profitable agriculture in a few months, than from his own solitary and unassisted efforts continued throughout a long life. [B.]

IV. Another and very important source of injury to agriculture is presented in the frequent and extensive changes of the boundaries of farms, which are necessarily made by the conflicting "see-saw" operations of our law of descents and law of enclosures—the first, for the purpose of legal division among heirs, compelling single farms to be cut up into several distinct shares of far less *proportional* value, because each is totally unfit for a single property—and the second, compelling the impoverished owners to sell their shares as they successively come to possession, or can find rich and contiguous purchasers, and thus to form newly arranged large farms out of four or five small ones. I mean not here to dispute the alleged political benefits of this cutting-up and piecing system—nor to inquire whether national liberty and popular rights might not have every existing security, without paying this ruinous tax, this never ending tribute from individual and national wealth, for their preservation. It is enough here to state that this impediment to agricultural prosperity exists—and it will scarcely be required to maintain the assertion, by argument or illustration. It is not the old and long debated contest as to the comparative advantages of farms being either generally large, or generally small. Both kinds have their respective advantages, and also their disadvantages, and the agricultural interest of the country demands that there should be farms of every size, not too large for one man's superintendence, or too small for one man's profitable employment. It is not to the sizes and boundaries of farms, as existing at any one time, that the objection applies—but to the continual changes of both, not required by the interests and wishes of proprietors, but compelled by the operation of law. A well arranged farm, whether large or small, can rarely be divided, or be consolidated with others, without great loss of labor expended for previous arrangements, which are rendered useless by the change of limits. This loss is compensated by no gain whatever, to other individuals, or to the commonwealth. When one-tenth of the value of a farm is destroyed by its being divided, or of a cluster of distinct farms, by consolidation, (and how rarely is the loss of less amount?—) that loss is absolute and complete to all parties—to sellers, buyers, and to the nation—as much so as if one-tenth of the land had been swallowed by an earthquake. The labors of another generation may, by new improvements, create a new, and even greater value—but cannot recover any part of what was lost. It would be far better if every farm, which was not divided by the will of its deceased owner, was sold entire, with its stock of every kind, and the proceeds divided among the heirs.

V. The inducement and bounty offered in the cheapness of lands, for emigration, forms another evil of great magnitude to the agriculture and welfare of Virginia. Every dollar taken off of the price of the government land in the west, probable serves to take twice as much from the selling price of ours'. If the present *minimum* price, $1 25 for public lands, was reduced to nothing, the lands of inferior quality in Virginia would not sell at all. This long existing, and probably increasing evil, is not only beyond the control of individuals, but also of our state government. We have only to hope for the best, and fear the worst results, in this respect, from the future action of the federal government.

But it is not the cheapness of the new western lands, nor their rich products and profits, that alone would serve to prostrate the prices and estimation of ours', and to discourage the most profitable investments and improvements, if these causes were not given a ten-fold strength by a generally prevailing madness for emigration, compounded of discontent with the really attainable advantages of our native land, and a credulous and too confident faith in the remote and untried blessings that are promised in the west. It is in vain that rich blessings are offered to our acceptance at home, if they are undervalued and despised. The fact cannot be disguised—Virginia is losing by emigration, not only in the population and wealth that are pouring out as a flood, but because what goes out of the state serves to lessen the value of all that is left behind. The most signal improvements that have been made in our agriculture, and the greatest profits thence derived, do not cause any general enhancement in the market price of lands, or serve to give a new impulse to general agricultural improvement and prosperity. Such particular improvements have merely served in some measure to stay our downward career, and therefore, their effects, however great and profitable, are not properly estimated, and indeed are not extensively known. Virginia is likely to be reduced to a condition that will need all the patriotism, zeal, and talents, of her remaining sons, to prevent their country becoming waste, and almost abandoned.

There is only one little spot in Virginia over which this mania for emigration has not spread

its malignant influence, and among the residents of which there exists generally a true love for the land of their birth. This is the narrow peninsula east of the Chesapeake—and the remarkable difference there exhibited, shows the rich reward which follows mere contentment and industry. With a soil that is generally far from fertile, and where their valuable means for fertilization have been but little used, the lands sell high, rent high, and both landlords and tenants are satisfied, comfortable, and thriving. There is no peculiar cause for this state of things, except that for this people it may be said that *there is no "western country."*

But however heavily all these evils may press on the interests of agriculture, there also exist abundant inducements to exert our energies to throw off the burden. If even partial success should reward the effort, the agriculture of Virginia might reach a point of very high improvement and prosperity. Let us keep in view continually the causes which have depressed agriculture, and now prevent its rising from its fallen state—and let us also look to the glorious and rich reward offered for successful exertions for relief. Fallen as it is from its former high estate, Virginia is still a country to be proud of—a rich inheritance, for which we have reason to be most thankful for possessing. A large proportion of the soil of the state is naturally and highly productive—and there are many farms, and some districts, of which the general husbandry may be compared with the best of the United States. The ruggedness of a large part of the mountain region is well compensated by its fertile soil and mineral wealth—its beautiful scenery, and pure, invigorating air. The low country, though generally poor, is as susceptible of *profitable* improvement as any region whatever—and on that account, as well deserves as the rich west itself, to be the object of speculators, treasure hunters, and builders of castles in the air. The intermediate region possesses in some, but a less degree, the advantages of both its western and eastern neighbors. In addition—all parts of the state are now about to derive the advantages of a general system of inland transportation, which seems now, for the first time, placed on the only stable foundation—that is, of yielding early and sufficient profit to the constructors, or stockholders, of canals and railways, as well as of general benefit to the country at large. Above all—as a ground for hope—Virginia's best product has always been of *men*—and though her sons have deserted her soil in such numbers as to furnish half the population of the new western states, still the *stock* remains at home, in its original purity and value. There are abundant means still remaining for the high improvement and permanent prosperity of this commonwealth—and nothing will be wanting to produce that result, unless it be the *will*, and the *resolution*, to use the offered means.

The great evils which serve to prevent agriculture being prosperous in Virginia, may be summed up in the single word, *ignorance:* but however heavy may be this burden and curse on a nation, its importance cannot be appreciated, and therefore will never be complained of, by the great mass of any people. The more dark and widespread may be the cloud of ignorance which ages of misrule may have caused to overshadow a country, the more contented will be the mass of the people with their destitution of light. In benighted Spain and Turkey, rebellions for unnumbered wrongs, are matters of every day occurrence: but not a complaint has been uttered, or even the ground for it suspected, that the governments of these countries have permitted and caused the almost extinction of knowledge—which is the fruitful source of all the other evils felt. The few persons who may understand the cause, are utterly powerless for its removal, or mitigation.

In the legislature of Virginia only can be found combined the *intelligence* to know, and to properly estimate, the evils which are crushing our agricultural interests—and the *power* to guard against, or to remove them. To the sense of justice and of policy, no less than to the patriotism of that body, we have to appeal—and upon the success of that appeal, sooner or later, will depend whether Virginia is to rise—or to sink, without a remaining hope. The *will* of the legislature alone will be potential: the mere disposition to grant aid, if earnestly felt, and barely commenced to be put in action, will soon ripen into a judicious and effective general system for the resuscitation and support of agriculture, and of agricultural interests. And the cost of these measures, (the only, but great obstacle—) will merely be a sum utterly contemptible compared to the value of the least of the expected results—and much less than of many customary legislative proceedings of the least possible value. The legislative expense of selecting a person to perform the mere ordinary mechanical services of a printer, has, for two sessions, been as great as would well support a professorship for the two years. No richer endowments need be desired for agricultural professorships, and for all such other aids to agricultural knowledge as are now wanted, than to divert to these ends, the cost of barely three or four days of the *excess* of debate of every legislative session—or of the tenth part, only, of the average expense of discussing abstract political, or mere party questions, or resolutions, which have led to no *direct* results whatever; but of which the *indirect* effects, for twenty years past, have been becoming more and more destructive of the true interests of Virginia.

APPENDIX.

Many of the circumstances which affected the early condition of agriculture in Virginia, and which were necessarily excluded by the proper limits for an address (and one of secondary importance) to a public meeting, are yet highly interesting. Extracts exhibiting such will be embraced in the first of the following notes—none of which (it is proper to say) were attached to the foregoing address, when sent in to the society by whose order it was prepared, and is now published.

NOTE A. page 748.

From the first settlement of Virginia, in 1607, until 1613, there was no such thing as distinct landed, or indeed other private property which was the fruit of individual labor or enterprise. This was one of the many unwise provisions of the charter of the London Company, (the corporation that settled and owned Virginia until its dissolution in 1624,) or of the regula-

tions made by that body—and this plan of having the settlers to labor in common, and without holding private property, would alone go far to account for the previous feeble and often suffering condition of the colony.

"Each individual put the fruits of his labors into the common stock, and industry and indolence were thus placed on the same footing. The disadvantages of such a procedure must be obvious. This was a property too vague and uncertain, to stimulate the enterprise and industry of the owner. The foresight of Dale put a stop to this evil; and though his remedy is partial and defective, it must still be considered as the dawn of civilization."—*Burk's History of Virginia, vol.* 1. *page* 172.

"The most honest and illustrious would scarcely take so much pains in a week, as they would have done for themselves in a day; presuming, that however the harvest prospered, the general store must maintain them; by which means, they reaped not so much corn by the labor of thirty men, as three men could have produced on their own lands."—*Purchas.*

"And now the English began to find the mistake of forbidding and preventing private property: For, whilst they all labored jointly together, and were fed out of the common store, happy was he, that could slip from his labor; or slobber over his work in any manner. Neither had they any concern about the increase; presuming, however, the crop prospered, that the public store must still maintain them.

"The five years also, prescribed in his majesty's instructions, under the privy seal, for trading altogether in common stocks, and bringing the whole fruit of their labors into common store houses, were now expired. Therefore, to prevent this inconveniency and bad consequence, Sir Thomas Dale allowed each man three acres of cleared ground, in the nature of farms. They were to work eleven months for the store, and had two bushels of corn from thence; and only had one month allowed them, to make the rest of their provisions. This was certainly very hard and pinching; but his new and favorite settlement at Burmudas Hundred had better conditions. For once month's labor, which must'neither be in seed time nor in harvest, they were exempted from all other services; and for this exemption, they only paid two barrels and a half of corn, as a yearly tribute to the store. However, the prospect of these farmers labors', gave the colony much content; and they were no longer in fear of wanting, either for themselves, or to entertain their new settlers. —*Stith, p.* 131.

Having commenced at this great cause of previous mishaps, I now return to note some of the most remarkable or interesting events that relate to the early agriculture or general economy of the colony of Virginia.

The ships which brought the first settlers, entered the Chesapeake on April 26th, 1607; and the landing at Jamestown, to make a permanent settlement, was on May 13th. No corn or other crop was made until the following year—and then but a very scanty supply. Within one month after the return of the ships to Europe, June 22, 1607, fifty of the settlers died from sickness caused principally by want and unwholesome food. "The survivors were divided into three watches, and subsisted on crabs and sturgeon till September," when new supplies were received from England.

"About this time also, there sprang up a very troublesome sect of gold finders, which was headed by captain Martin, and warmly embraced by Newport. There was no thought, no discourse, no hope, and no work, but to dig gold, wash gold, refine gold, and load gold; and notwithstanding captain Smith's warm and judicious representations, how absurd it was, to neglect other things of immediate use and necessity, to load such a drunken ship with gilded dust; yet was he overruled, and her returns made in a parcel of glittering ore which is found in various parts of the country, and which they very sanguinely concluded to be gold dust: And in her they sent home Mr. Wingfield and captain Archer, to seek some better employment in England, for they had assumed many empty titles of offices here, as admirals, recorders, chronologers, justices of the peace, and of the courts of plea, with other such idle and insignificant pretensions."—*Stith, p.* 60.

After the third crop season, and second actual harvest, the agricultural condition of the colony may be gathered from the following statement, which the historian evidently presents as highly prosperous: and indeed, so it was, compared to the state of things before, and after the end of the administration of Capt. Smith, but for whose conduct the very existence of the colony would have been lost.

"And thus, about Michaelmas, one thousand six hundred and nine, Captain Smith left the country, never again to see it. He left behind him, three ships and seven boats; commodities ready for trade; the corn newly gathered; ten weeks provision in the store; four hundred ninety and odd persons; twenty-four pieces of ordnance; three hundred musquets, with other arms and ammunition, more than sufficient for the men; the Indians, their language, and habitations, well known to an hundred trained and expert soldiers; nets for fishing; tools of all sorts, to work; apparel, to supply their wants; six mares and a horse; five or six hundred hogs; as many hens and chickens; with some goats, and some sheep. For whatever had been brought, or bred here, still remained. But this seditious and distracted rabble, regarding not any thing, but from hand to mouth, riotously consumed what there was; and took care for nothing, but to color and make out some complaints against Captain Smith."—*Stith, p.* 155.

But the miserable crops made under the joint-labor and common-property system, and the larger supplies of food received from England, were insufficient without the corn obtained in trade, (or by fraud or force,) from the natives. War, soon after Smith's departure, cut off this supply.

"Famine now made its appearance, attended with circumstances at once melancholy and disgusting: Food, the bare idea of which, during better days, had created loathing and disgust, was now seized on, with greedy and bestial voracity."—*Hist. of Va., p.* 157, *vol.* 1.

"Those who had starch, made no little use of it, in this extremity; and the very skins of their horses were prepared, by stewing and hashing, into a dainty and welcome food. Nay, so great was the famine, that the poorer sort took up an Indian, that had been slain and buried, and eat him; and so did several others, one another, that died, boiled and stewed with roots and herbs: And one, among the rest, killed his wife, powdered her up, and had eaten part of her, before it was discovered; for which he was, afterwards, severely executed. In short, so extreme was the famine and distress of this time, that it was, for many years after, distinguished and remembered by the name of the starving year."—*Stith, p.* 117.

"In the midst of the distresses of the Virginia colony, the remembrance of Smith obtruded itself, awakening in them bitter regrets for his loss, and calling out severe reproaches on themselves, for their baseness

and ingratitude. From five hundred, their number was soon reduced to sixty men, women, and children; and this miserable remnant, could not reasonably calculate on the security of a single hour, from the assaults of the savages, even though by some miracle they should escape the agony of disease, and the torments of famine.

"In this forlorn condition, they were found by Sir T. Gates and Sir G. Somers, who, on the twenty-fourth of May, arrived in two barks, built with such materials, as they could find in Bermudas, assisted by the wreck of their own ship. It required them but little observation, to be convinced of the inadequacy of their means to remedy an evil so woeful and extensive; and after a short consultation, it was unanimously determined to abandon the enterprise. The colonists, with whatever was most valuable, being embarked, the ships dropt down the river to Mulberry Island: So near to entire extinction, was the germ of this mighty nation."—*Hist. of Va., p.* 159, *vol.* 1.

"The colonists were importunate to burn the town and fortifications; but God, who did not intend that this excellent country should be abandoned, put it into the heart of Sir T. Gates to save it."—*Stith, p.* 117.

A boat met them before they reached the mouth of the river, and announced that Lord de la War's fleet was near at hand, bringing reinforcements, and every needful supply. Under his command the wretched fugitives returned to the deserted walls of Jamestown.

"But while the Virginia establishment was thus almost miraculously preserved by the arrival of Lord de la War, a danger of no less magnitude awaited it in the impatience of the company in London, and their inordinate expectations of immediate profit. It appears, that the genuine commercial spirit, which works by bold enterprise and patient industry, was debauched at this day, by the bewitching reports of Spanish discovery; and the value of distant possessions, was estimated by the mines of rich metals they were supposed to contain. Disappointed in their expectations of discovering a Potosi in Virginia, the question was seriously discussed, whether the enterprise should not be abandoned. But the testimony of Sir T. Gates, solemnly given in at one of the quarter courts, backed by the representations of Lord de la War, who published a treatise on the occasion, removed the veil, which ignorance and misrepresentation had drawn before the eyes of the company; and it was determined once more, to prosecute the enterprize with spirit and activity.

"Sir T. Dale, with three ships abundantly supplied with all necessaries, arrived the 10th of May. He found the colony, as usual, indolent and improvident. To those vices their mode of living had added a disposition to mutiny, which being general and habitual, it was more difficult to repress."—*Hist. of Va. p.* 163, 165.

These "representations" of Lord de la War, (made no doubt in sincerity, and what he thought truth,) will show that in that day "western country" descriptions were at least as highly colored as those which now are drawing away the people of *this* land of milk and honey.

"The substance of these representations was, that the country was rich in itself, but that time and industry were necessary to make its wealth profitable to the adventurers; that it yielded abundance of valuable woods, as oak, walnut, ash, sassafras, mulberry trees for silkworms, live-oak, cedar, and fir for shipping; and that on the banks of the Potowmac, there were trees large enough for masts, that produced a species of wild hemp, for cordage, pines which yielded tar, and a vast quantity of iron ore; besides lead, antimony, and other minerals, and several kinds of colored earths; that in the woods were found various balsams, with other medical drugs, with an immense quantity of myrtle berries for wax; that the forests and rivers harbored beavers, otters, foxes, and deer, whose skins were valuable articles of commerce; that sturgeon might be taken in the greatest plenty, in five noble rivers; and that without the bay to the northward, was an excellent fishing bank for cod of the best quality; that the soil was favorable to the cultivation of vines, *sugar canes*, *oranges*, *lemons*, *almonds*, and rice; that the winters were so mild, that cattle could get their food abroad, and the swine could be fattened on wild fruits; that the Indian corn yielded a most luxuriant harvest; and in a word, that it was "one of the goodliest countries," promising as rich entrails as any kingdom of the earth, to which the sun is so near a neighbor."—*Purchas.*

At the close of Sir Thomas Dale's administration, the colony had so much stability, that the grants of 100 acres, which before had been made to every new settler, were reduced to 50 acres—

—"and this alteration had its rise in the opinion, that the country being likely to flourish, and the difficulties of making settlements consequently having become proportionably less, it was no longer necessary or politic to hold out such strong inducements to emigration."—*Burk, p.* 177.

The following gives some idea of the money value of lands at this time. Besides the general mode above stated of granting lands to settlers, there were two others. The first mode, probably, was the origin of the "aristocracy" of Virginia.

"When any person had conferred a benefit, or done service to the company or colony, they would bestow such appropriation of land upon him. However, to prevent excess in this particular, they are restrained by his majesty's letters patent, not to exceed twenty great shares, or two thousand acres in any one of these grants. The other was called the adventure of the purse. Every person, who paid twelve pounds ten shillings into the company's treasury, having thereby a title to an hundred acres of land, any where in Virginia, that had not been before granted to, or possessed by others."—*Hist. of Va., p.* 178.

The habits of the colonists had now become industrious, and of course, there was no more scarcity.

"Nay, whereas they had formerly been constrained to buy from the Indians yearly, which exposed them to much scorn and difficulty. The case was so much altered under his management, that the Indians sometimes applied to the English, and would sell the very skins from their shoulders for corn. And to some of their petty kings, Sir Thomas lent four or five hundred bushels; for re-payment whereof next year, he took a mortgage of their whole countries."—*Stith, p.* 140.

"The attention of [The London, or Proprietary] Company was directed with equal care to almost every subject of political economy; and as the country as yet held out no prospects of sudden wealth in the working of mines, agriculture was naturally resorted to as the means of trade and subsistence. Tobacco had in some degree grown into notice by the whim of the colonists, and the fashion of the times, unaided by the patronage, and indeed, in defiance of the repeated injunctions of the company. But a strange taste for this nauseous plant was rapidly gaining ground in Europe; and the king, notwithstanding his unaffected antipathy to it, tempted by the prospect of revenue, at length permitted it to be entered in 1614, as a regular article of trade. The colonists had learned the art of planting corn, together with the use of this valuable production,

from the Indians. Vineyards were attempted; and experienced vine-dressers sent over for this purpose. The culture of silkworms was recommended with a like anxiety; whilst anniseed, flax, hemp, wheat, and barley, with various other productions, formed a large and judicious list for future essay and experiment. Colonies will, for a considerable time at least, reflect the manners and pursuits of the parent state. During the last years of the reign of James, a considerable taste for agricultural inquiry prevailed; and numerous treatises were published on the subject. The company sent over several of those tracts, for the use of the colony. It is not surprizing, that at this time, a rage for speculative farming prevailed in the colony.

"The commerce of Virginia, from the nature of things, was for a long time of little value. Before the year 1614, she had no staple. But once, that she was legalized as a a fair trader, and the industry of her citizens was excited by the prospect of wealth and the security of freedom, her advances were unparalleled and almost miraculous. In the year 1620, her tobacco was more than sufficient for the English market, and the continent was resorted to, as a vent for the superfluity. —*Hist. of Va.*, *vol.* 1, *p.* 305.

Tobacco was not only the staple crop, but it soon became, and long continued, the greater part of the legal and current money of Virginia. Payments and fines fixed by law were generally specified in tobacco—and that kind of money was not entirely displaced until the revolutionary war. Even after tobacco was no longer a legal tender in payment, habit and convenience continued to make tobacco notes, (or the certificates of hogsheads of tobacco, and their weights, being deposited in the public inspection houses,) a common currency. It is not 40 years ago since a tobacco note passed from hand to hand for the sum that the hogshead would sell for, and the possession of the note was the evidence of ownership. There was much convenience in this before other paper money had been authorized by law—and such a paper currency had the rare advantage of being the representative of *real value*. But this conversion of tobacco to current money, and at a fixed legal rate, doubtless aided in this respect the universal tendency of all legal inspections of the qualities of commodities—that is, of *deteriorating* the quality, and of course, ultimately, the market price. The legal inspection of tobacco remains to this day a prominent feature of the absurd and general inspection system: and the only redeeming merit of this is, that the certificates of the inspectors, as to the quality of the tobacco, are universally and totally disregarded as evidences of value.

I proceed to give some of the early rates of value as estimated in tobacco, and fixed by the governors' proclamations.

"During the administration of Captain Argall, tobacco was fixed at three shillings the pound. In 1623, Canary, Malaga, Alicant, Tent, Muskadel, and Bastard wines, were rated at six shillings in specie, and sack, nine shillings the gallon payable in tobacco. Sherry, and Aquavitæ, at four shillings, or four and six-pence in tobacco. Wine vinegar at three shillings, or four shillings and six-pence in tobacco. Cider and beer vinegar at two shillings, or three shillings in tobacco. Loaf sugar, one shilling and eight-pence per pound, or two shillings and six-pence in tobacco. Butter and cheese eight-pence per pound, or one shilling in tobacco. Newfoundland fish per cwt. fifteen shillings, or one pound four shillings in tobacco. Canada fish, two pounds, or three pounds ten shillings in tobacco. English meal sold at ten shillings the bushel, and Indian corn at eight."—*Hist. of Va.*, *vol.* 1. *p.* 307.

In 1607, an improvement was made in the mode of curing tobacco, which was deemed of enough importance to be stated in history. [*Stith*, *p.* 147.] Previously, it had been cured in heaps. Mr. Lambert discovered that it cured better hung on lines, or on sticks, as in now customary.

"One hundred dissolute persons, at the express command of his majesty, delivered by his marshal, were sent over as servants, [in 1619,] much to the dissatisfaction and inconvenience of the company, who were obliged instantly, at the positive urgency of the king, to hire ships at an advanced premium.

"At the instance and advice of the treasurer, one hundred virgins were sent over as wives, for the purpose of fixing to the soil, the roving and inconstant spirits of the colonists."—*Hist. of Va.*, *vol.* 1, *p.* 206.

"Such of these maids as were married to the public farmers, were to be transported at the company's expense, but if they were married to others, that then those who took them to wife, should repay the company their charges of transportation.' —*Stith*, *p.* 166.

"The arbitrary conduct of the king, with regard to the persons ordered for transportation, was followed by one equally flagrant and unjust, respecting tobacco, contrary to the plain and express words of their charter, which exempted them from all custom and subsidy for twenty one years, excepting only five per cent. upon all such goods, &c. "as should be imported into England," &c. The Spanish tobacco, which generally brought eighteen shillings the pound, and tobacco of Virginia, which was sold at three, were fixed by the financial logic of the farmers of the customs, at an average ratio of ten shillings the pound; while with a consequence perfectly consistent with the premises, a duty of six-pence the pound was demanded on the whole." —*vol.* 1, *p.* 207.

"Tobacco had become the staple of the country; and with this article the colonists not only stocked the English market, but had opened a trade for it with Holland, and established ware-houses in Middleburg and Flushing.

"The king, notwithstanding he professed on all occasions the most marked dislike and aversion to this commodity, and had even labored to write it into disrepute,* did not see with indifference the diversion of a part of his revenue into foreign states, by the trade of the colonists. In vain the petition of the colonists, and the remonstrance of the company, attempted to soften or remove the obduracy of the monarch. Their deputies had to encounter the stern denial of justice from the privy council, in addition to the frowns and insolence of office. They were ordered to bring all their tobacco into England, in despite of their privileges as Englishmen, and the plain letter of their charter."—*vol.* 1, *p.* 209.

"This year (1620) was remarkable for the introduction of negro slaves into the colony—an evil, than which, none can be conceived more portentous and afflicting. A Dutch ship bound homeward from the coast of Guinea, sold twenty of this wretched race to the colonists."—*vol.* 1, *p.* 210.

In 1621, various things most needed by the colony were subscribed, or advanced on loan, by individuals of the company in England, to be sold in Virginia on certain terms, for re-payment. The most remarkable venture enrolled, consisted of—

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*See at page 11, vol. ii. of the Farmers' Register some amusing passages extracted from King James' *Counterblaste to Tobacco*.

"an hundred more maids, to make wives; and sixty were accordingly sent, young, handsome, and well recommended to the company, for their virtuous education and demeanor.

"With them was sent over, the several recommendations and testimonials of their behavior, that the purchasers might thence be enabled to judge how to choose. The price of these wives was stated at an hundred pounds of tobacco, and afterwards advanced to one hundred and fifty, and proportionably more, if any of them should happen to die; so that the adventurers might be refunded their original charge: And it was also ordered, that this debt of wives, should have the precedency of all others, and be first recoverable.

"And it was strictly enjoined, that they should be used well, and not married to servants, but to such free men and tenants, as could handsomely support them; that, by their good fortune, multitude, of others might be allured to come over, on the prospect of advantageous matches. And the company likewise declared their intention, that, for the encouragement of settled families, and securing a posterity, they would prefer and make consignments for married men, before single persons: and that as many boys should be sent as there were maids, to be apprentices to those who married them. They also granted adventurers, who subscribed to this roll, a ratable proportion of land, according to the number of maids sent, to be laid off together, and formed into a town, by the name of Maidstown."—*Stith, p.* 197.

In the same year, the instructions to the authorities, brought out by Governor Yeardly—

"pressed upon them the raising several useful commodities, as well as corn, wine, silk, and others heretofore frequently mentioned; as also making oil of walnuts, employing their apothecaries in distillation, and searching the country for minerals, dyes, gums, drugs, and the like: and they ordered them, particularly by the king's advice and desire, to draw the people off from their excessive planting of tobacco. To that end, they were commanded to permit them, to make only an hundred pounds of tobacco ahead; and to take all possible care to improve that proportion in goodness, as much as might be, which would bring their commodity into request, and cause a more certain benefit to the planter."—*Hist. of Va., vol.* 1, *p* 226.

The letters of the governor and council in 1821, to the company, state, "that tobacco was stinted to 100 plants per head, nine leaves to a plant," for each individual cultivator.

Among the laws made by the assembly in 1624, were the following:

"That whosoever should absent himself from divine service any Sunday, without an allowable excuse, should forfeit a pound of tobacco, and that he who absented himself a month, should forfeit fifty pounds of tobacco: That there should be an uniformity in the church, as near as might be, both in substance and circumstance, to the canons of the church of England; and that all persons should yield a ready obedience to them, upon pain of censure: That the twenty-second of March (the day of the massacre) should be solemnized and kept holy; and that all other holidays should be observed, except when two fell together in the summer season, (the time of their working and crop,) when the first only was to be observed, by reason of their necessities and employment: That no minister should be absent from his cure above two months in the whole year, upon penalty of forfeiting half his salary; and whosoever was absent above four months, should forfeit his whole salary and his cure: That whosoever should disparage a minister, without sufficient proof to justify his reports, whereby the minds of his parishioners might be alienated from him, and his ministry prove less effectual, should not only pay five hundred pounds of tobacco, but should also ask the minister forgiveness publicly in the congregation: That no man should dispose of any of his tobacco before the minister was satisfied, upon forfeiture of double his part towards the salary; and that one man of every plantation should be appointed to collect the minister's salary, out of the first and best tobacco and corn."—*Hist. of Va. vol.* 1, *p.* 280.

"That, for the people's encouragement to plant a store of corn, the price should be left free, and every man might sell it as dear as he could: (for the governor and council did then, and long afterwards, set a rate yearly upon all commodities, with penalties upon those who exceeded it.) That there should be a public granary in each parish, to which every planter above 18 years of age, who had been in the country a year, and was alive at the crop, should contribute a barrel of corn, to be disposed of for the public uses of the parish, by the major part of the freemen; the remainder to be taken out by the owners yearly, on St. Thomas's day, and the new brought and put in its room: That three capable men of every parish, should be sworn to see that every man planted and tended corn sufficient for his family; and that those who neglected so to do, should be presented by the said three men, to the censure of the governor and council: That all trade with the Indians for corn, as well public as private, should be prohibited after the June following: That every freeman should fence in a quarter of an acre of ground, before the Whitsuntide next ensuing, for planting vines, herbs, roots, and the like, under the penalty of ten pounds of tobacco a man; but that no man, for his own family, should be obliged to fence more than an acre; and that whosoever had fenced a garden, and was ousted of the land, should be paid for it by the owner of the soil; and that they should also plant mulberry trees."—*vol.* 1, *p.* 283.

It seems that the ladies of former days were at least as much given to coquetry as their fair descendants—but that they did not escape as easily as now from all ill consequences of their offence. The peculiar circumstances then existing—the number and variety of suitors, and the strong proofs of their love, offered by the readiness of each to exchange his whole market crop for a portionless bride—served to increase this natural propensity of the fair sex, and ought to have made the offence more pardonable. But the assembly took the matter in a more serious light, as by their enactment of 1620—

"the governor was obliged, soon after, to issue a proclamation, forbidding women to contract themselves to two several men at one time. For women being yet scarce, and much in request, this offence was become very common; whereby great disquiet arose between parties, and no small trouble to the government. It was therefore ordered, that every minister should give notice in his church, that what man or woman soever should use any word or speech, tending to a contract of marriage, to two several persons at one time, although not precise and legal, yet so as might entangle or breed scruple in their consciences, should, for such their offence, *either undergo corporal correction*, or be punished by fine, or otherwise, according to the quality of the person so offending."— *Hist. of Va., vol.* 1, *p.* 85.

We have certainly improved greatly in this respect in Virginia. This amiable weakness of the best of nature's works, is no longer threatened by *law* with "corporal correction"—nor have we given the least countenance to the even baser modern fashion of the more northern states, of jilted lovers seeking alleviation of their woes, by bringing suits for pecuniary damages.

In 1629, it was required by the government that "every laborer should tend two acres of corn,or forfeit all his tobacco."

The quantity of tobacco which each person had been permitted to raise annually, was increased to "three thousand plants for men, and two thousand for women and children. This was afterwards restricted to two thousand, nine leaves on a plant, and no slips or seconds were permitted to be planted."

But no degree of restriction on the amount of cultivation, had served its intended object of improving the quality and the price of tobacco: and instead of such partial restrictions, it was now proposed that the extraordinary measure should be adopted of an entire cessation of the raising of tobacco, for a certain limited time. It increased the strangeness of the matter, that the people were more anxious to be thus restrained, than the government to impose the restriction. But now, to make the cessation effectual, it required the co-operation of the younger colonies of Maryland and Carolina.

"Meanwhile the depreciation continued to such an extent, that the planters were scarcely able to clothe their families by the sale of their crops. An answer arrived at length from the chancellor of Maryland, enclosing the lieutenant governor's proclamation, enjoining a total cessation for a given time, to all the subjects of that proprietary.

"These letters accompanied with his own correspondence, the governor laid before the house; and the question being taken whether this was a sufficient confirmation, it was decided in the affirmative. By this decision an act made during the former session restricting the planting of tobacco from the first of February, 1666, to the first of February, 1667, was declared to be in force; and the governor was directed to signify the same by proclamation to the several counties."—*Hist. of Virginia, p.* 193, *Vol.* 2.

"But the benefits to be reaped from these projects, even though successful, were remote; and the necessities of the colony were immediate and pressing. Doubts began to be entertained of the good faith of Maryland in observing the cessation; and they were haunted with apprehensions lest, after tying up the industry of the colonists, by prohibiting the culture of their only staple, the project should be defeated by the avarice of a people who would grow rich by their ruin."—*Hist. of Va. p.* 192, *vol.* 2.

But however small the benefit found in this trial of the cessation of the culture of tobacco, its repetition continued to be urged as a favorite remedy for low prices. In 1681, the council wrote to Lord Culpeper, the governor then in England, respecting sundry grievances of the colony, and "entreated that his influence might be used to procure a cessation in planting tobacco."

"Meanwhile the rapid depreciation of tobacco, added to the operation of the commercial restraints imposed by parliament, had produced a general dissatisfaction among the people. They had vainly attempted to apply a remedy to the former evil, by procuring the co-operation of Carolina and Maryland. This plan had failed through the jealousy or avarice of those governments; and they were left to struggle with difficulties, which were daily accumulating, and of which they could see no prospect of termination. They could not even hope for the sanction of their own government, which formerly approved a cessation. Other maxims were now entertained by the executive, more suited to the views of the court; and the inquiry was not, what would be beneficial to the country, but how will it affect his majesty's revenue?"—*Hist. of Va. p.* 228, *vol.* 2.

The popular desire for the *cessation*, added to the pressure of some other real (but less regarded) oppressive measures of government, produced much discontent, and finally broke out in the insurrection.

"The people of several counties, having lost all hope of a cessation by the dissolution of the assembly, ran together tumultuously, and proceeded to the entire destruction of the tobacco plants in the beds, before they were transplanted. Their proceedings were so timed, that the season was too far advanced to make good the loss by seed; and as the culture of sweet scented tobacco was almost exclusively confined to Virginia, they directed their efforts peculiarly to the destruction of this sort."—*Hist. of Va. p.* 233, *vol.* 2.

"The governor now left to the exercise of functions purely executive, proceeded to a severe inquiry into the late insurrection. The king had instructed him that the plant cutters and their instigators, came properly within the purview of the statutes relating to treason, and had commanded, that the rioters should be proceeded against by the attorney-general, and punished with the utmost severity."—*Hist, of Va. p.* 240, *vol.* 2.

The following is the earliest notice of cotton crops having been recommended.

"Sir Edmund Andross was a great encourager of manufactures. In his time fulling mills were set up by act of assembly. He also gave particular marks of his favor towards the propagating of cotton, which since his time has been much neglected."—*Beverley*, § 142, *p.* 90.

The following extract will give some interesting information on the value of agricultural products, and other commodities.

"The price of corn and other articles of food, during this epoch, varied considerably, according to circumstances. Corn, at a medium, sold from ten to eighteen shillings the barrel. A bull was worth seven hundred pounds of tobacco, or eight pounds fifteen shillings. Poultry would naturally command a greater price, from the delays and difficulty of procuring a stock from Europe, and the inconvenience of their multiplication amongst cultivators, whose whole attention was almost wholly engrossed in clearing the forest for cultivation. A goose, during the administration of Hervey, cost twenty shillings, and we should conclude that other fowls were in proportion.

"The rates of ordinaries, established in 1666, by Sir William Berkeley, will throw more light on this head than is to be collected from the rates of separate commodities. As these rates were stated to have been fixed, in order to prevent the extortion of keepers of taverns and eating houses, we should conclude they are lower than the previous charges.

A meal for a master,		15lbs.	tobacco.
Ditto for a servant, - -		10	do
Lodging for either (per night)		5	do
Spanish wines, per gallon,	10s. or	100	do
French do	8s. or	80	do
Brandy, English spirits, or Virginia dram,	16s. or	160	do
Rum, - - -	10s. or	100	do
Beer, - - -	4s. or	40	do
Cyder or perry, - -	2s6 or	25	do

These two last are stated to be rated proportionally higher, in order to encourage the produce of the country.

"From the circumstances of the colony, an horse must have been an animal at once rare and valuable In the year fifty-six the assembly ordered two thous-

and five hundred pounds of tobacco to be paid to John Page, for a horse lost in the expedition against the Rechahecrians. The complaint of Page, and the wording of the order, show, that this sum was not thought equal to that which the horse might have commanded. If we estimate the tobacco at the market price only six years after, it will amount to an hundred pounds; a prodigious price, if we consider the rates in Europe during this period. In the same year, on the petition of Richard Nicholas, it was ordered, "that sixteen hundred pounds of tobacco be paid him, for the charges and cost he had been at in recovering and finding a horse, which had been on the service in the same expedition." At the same time Richard Walker was ordered five hundred pounds of tobacco "for finding the horse of Henry Jupons, and four hundred more when he found that of Richard Eggleston."—*Appendix, Hist. of Va. p. xxxii. vol.* 2.

NOTE B. page 753.

The foregoing address was drawn up in the early part of January, to be delivered at the annual meeting of the Historical Society which was to have taken place on the 9th of February, but which was postponed from time to time, until March 2nd. When this task was undertaken, the attempt was about to be made through an Agricultural Convention, to obtain some legislative aid for the diffusion of agricultural knowledge; and the writer hoped, in this manner, to lend some feeble aid to that praise-worthy but fruitless effort. This intention, in some measure, directed the treatment of the subject, and induced the expression of hopes, which had not then been prostrated—as they were afterwards, and indeed before the meeting of the Society was finally held—by the total neglect of the whole subject, by the legislature of Virginia. When recommending objects for legislative encouragement, in aid of agricultural instruction, two principal, and and very important subjects were designedly omitted. The one was the circulation of agricultural periodical publications; the other, the establishment and support of agricultural societies. The recommendation of the first was forbidden by the writer's private interest being connected with what he might advocate—and the second, because much space would have been required to explain his views of what agricultural societies *ought to be*, and the objections to their *usual* procedure, and because the subject had been treated fully upon several previous occasions. See Farmers' Register, Vol. I. pp. 147, 201, and Vol. II. p. 257.

From the New England Farmer.

IRRIGATION.

Extract from a communication from JOHN W. LINCOLN, of Mass.

Having had some experience in this busines, I am disposed to offer myself as a witness, premising that no school boy is more amused by paddling in the water, than I am pleased with turning it about from place to place on my farm, knowing that I could in no other manner be so profitably employed; gratified with witnessing from time to time the superior growth of the grass, and anticipating the pleasure of seeing a heavy swath when it shall be cut.

My late father was in the practice of irrigating a portion of his land on the farm on which I was born, on which there are tracts which have, within my own knowledge, for nearly forty years annually produced large crops of hay, without the aid of any manure, except that derived from water. In the spring of 1820, on the decease of my father, that farm, now owned by my brother, was placed under my superintendence; and from that time to the present my attention has year by year been called to the subject of irrigation, and during that time I have known no year, however moist has been the season, in which I have not derived much benefit from the artificial use of water on my land. The farm on which I now reside came into my possession in 1820, previous to which time, a portion of it had been irrigated, but the works, from disuse, were much out of repair. It not being convenient for me to take it under my own immediate supervision, I rented it, as it has been rented for many years, on shares. I however at my own charge put the dam, the principal trench, and several of the smaller ones in repair, and endeavored to persuade my tenant, that it was much for his interest to make use of them. But whether he believed that our climate did not require this mode of improvement, that a kind Providence would supply all the moisture which was necessary for vegetation, or was unwilling to devote proper attention to this subject, I know not, it was much neglected. In 1829, my barn being then old, and much out of repair, I caused it to be pulled down, and another to be erected of a different form and greater capacity. When I showed the plan of the proposed structure to my tenant, he expressed much surprise that I should think of erecting so large a building, saying that all the produce of the farm would not half fill it. I told him that I was satisfied that the farm, if properly managed, was capable of filling it, and that if I continued in the enjoyment of health for a few years, that I should see the barn full. It was true that after the barn was erected, and the crops gathered, not half the barn was occupied: and it is also true, that after the last harvest there was very little spare room in my barn. On the first day of April, 1830, I took my farm into my own care, and I was obliged to purchase several tons of hay to support what stock was then there, until vegetation was so far advanced, as to enable them to obtain a living abroad. I have been gradually increasing my stock as I had more food to sustain them, and now keep more than twice the stock of 1830, and have now considerably more hay than can be necessary for their support, several tons of which I shall sell. And this change has been effected principally by irrigation. I say principally, because I have during that time purchased some manure, but I have also received for hay sold, nearly as much money as I have paid for manure; and perhaps something is to be attributed to a different mode of husbandry on lands not irrigated, but the improvement which has been increasing from year to year, is in a great degree owing to the use of water. I have strong reason to believe, that by employing the same means I shall be able to add greatly to the future crops of my farm. I have not heretofore derived so much advantage from this mode of improvement as might have been expected: my engagements have required me to be frequently absent from home, and consequently I have not been able

to devote so much attention to the work as I desired.

It may be well to notice in this connexion, a fact which I am aware may be urged to discredit the favorable representations of this mode of improvement, that tracts of land even in England, in Pennsylvania, and elsewhere, were formerly irrigated, but the practice has now been abandoned. I believe in every case of failure the cause may be directly traced either to improper management, or to culpable neglect; such, I have already stated, was the case on my own farm, previous to my taking charge of this work in person, and such I have no doubt would be found to be the case in every other instance, could a proper inquiry be instituted. There is usually a strong indisposition to undertake or continue that which requires constant and daily attention; and this attention must be given to the work by those who intend to derive any advantage from it. Some will turn the water on to the land; their usual work is on another part of the farm; it is inconvenient for them to go to their ditches, and the water is allowed to run over their land, until the person who should have attended to it, happens to be that way, however long the time may have been; he afterwards perceives that a cold water grass is growing on his land, condems the water, instead of his own negligence, and the practice of irrigation is abandoned. There is no business that requires more attention than irrigation, from early in the spring until near the time of mowing the grass. If the water runs long on the same land without intermission, instead of being of benefit, it is working an injury. It is desirable that it should be changed each day, but should never be allowed to run more than two or three days on the same part of the land at any one time.

Having attempted to show that irrigation in our climate is *beneficial*, that good husbandry requires that that mode of improvement be adopted wherever opportunity is afforded, I shall now endeavor to controvert the position that "it is too expensive for our scale of husbandry." That "systematic irrigation," in conformity to the scientific rules, as laid down in the books, is expensive, I shall not deny. But if this expenditure was necessary to enable a farmer to make use of water, which, however, is not the case, the increased crops would soon reimburse the expense. From my own experience, I can say that I know of no mode by which hay can be obtained so cheaply as by the use of water. The greater portion of the land which I irrigate is interval, situated upon the margin of the Blackstone river, from which stream the water is taken. The ground is, as is usual with alluvial lands, highest near the stream, and descends towards the high bank, it also descends with the river. Near the high bank is a hollow, usually here called a slang, which extends the whole length of the interval, with branches diverging, and some of them extending across the interval. For the purpose of conveying the water to be distributed over the lower portions of the interval, it was necessary to cross several of these hollows, and as it would be necessary to pass over them with a team in the gathering the crops, I made two walls sufficiently wide for a cartway between them, filled the space with gravel, and made my ditch over the embankment. That the embarkment might not operate as a dam, a culvert was constructed under it, enable me to continue my trench drain without interruption, to carry off the surplus water. Where it is not desired to be at the expense of a stone culvert, a very cheap one may be constructed, by fastening four pieces of plank together, to serve as a trunk to convey the water of the drain. The weir or dam, and a part of the principal ditch for conveying the water on to the land, were constructed before the farm came into my possession, all the smaller ditches and trench drains have been made by me, in the following manner:—After having particularly examined the ground, by repeatedly passing over it, for the purpose of forming an opinion of the proper plan of laying out the work, I went on to the ground with my level, and with a man to assist me. I commenced the marking out the location for a ditch, as high up the main ditch as the water could be taken upon the land, and my assistant stuck into the earth small sticks, with which he had prepared himself, at short distances, and at such places as by the level I used would enable me to keep the ditch nearly or quite level, and in a direction as nearly at right angles with the main ditch, as the form of the land would admit, which was, however, frequently in a very serpentine course. Having in this manner marked out as many ditches as I supposed necessary, and at such distances as would enable me, as I then judged to water all the land in a short time, I with a plough and with a steady ox team turned a furrow each way to the centre, in a line indicated by the small sticks, and thus my ditch was formed. The sods may be used in levelling any inequality in the land or as I prefer, they may, with the dung-fork, be readily thrown into a cart, and deposited in the barn, or hog-yard, to be there converted into manure. If after turning the water into the ditch thus made, I find any slight inequality in the surface of the outside of the ditch which allows the water to escape before the ditch is entirely filled. I take sufficient earth from its bottom to level its bank, so that the water will trickle over the land the whole length of the ditch. When I first commenced this business, I left the panes between the ditches too large, as I found by observation that a portion of them did not obtain a supply of water: but this defect I have since remedied by making intermediate ditches. In all the slangs a trench drain should be constructed to conduct off the surplus water. As all stagnant water, if it remains long on the land, is prejudicial to vegetation, every hollow should have a drain attached to it, and to this thing too much attention cannot be paid. Before making the drains it is desirable that a careful examination should be had, to determine whether the same trench that is used as a drain for one part of the land, may not be used to conduct the water on to another portion of the land on a lower level; from this I have derived much advantage. As the quantity of interval land which I irrigate is so extensive, being estimated at more than thirty acres, that I could not, if I wished, suitably water it all at one time, I have therefore in the main ditches several hatches or flumes to enable me to turn the water at pleasure on such part as I may wish. I have found it convenient to place at the mouth of each of my small ditches, a small flume made by taking four pieces of plank, and fastening them together by large nails, the ends being left open, and the top plank

about four inches shorter than the sides or bottom, the ends of the plank to be even with each other at one end, and a board to be fitted in as a gate and kept in its place by cleats nailed on the sides of the trunk at the other end. I have usually divided my watering into parts, and when I can attend to it, I change the water each other day, (each day would be better,) so that the water will be on the land two days, and off six days, or I can shut it off entirely at pleasure. By the aid of the small flumes above mentioned, I am able to turn the water from one part of my interval on to any other part which I wish to irrigate, with very little loss of time, beyond that of passing to and from the land.

PROCEEDINGS OF THE PETERSBURG RAIL ROAD COMPANY.

At the Annual Meeting of the Stockholders of the Petersburg Rail Road Company, held at the Bollingbrook Hotel in the town of Petersburg, on Monday, March 7th 1836—

John D. Townes Esq., Mayor, was appointed Chairman, and Samuel Mordecai, Secretary.

It being ascertained that of 6025 shares which constitute the stock of the company, 5561 were present, the meeting proceeded to business.

Charles F. Osborne Esq., President of the company, presented a report of its operations and condition, accompanied with various tabular statements, and also a report made to him by H. D. Bird Esq., Engineer—all which were accepted.

The following resolutions were adopted unanimously.

Resolved, That the President and Directors he and they are hereby authorized, to borrow any sum of money, not exceeding sixty thousand dollars, to refund the amount hitherto expended, or which may hereafter be required for the purpose of extending and perfecting their arrangements, and for procuring an increased number of locomotive engines, coaches, and cars, for the use of the company.

Resolved, That the President and Directors be and they are hereby empowered and authorized, to arrange with the President and Directors of the Greensville and Roanoke Rail Road Company, for the general transportation on their road by this company, provided such an arrangement can be made on fair and equitable terms, and advantageous to the interests of both companies.

Resolved, That this meeting approve of the application made to the present legislature of this state for amendments to the charter of this company, and should the legislature grant the same, in conformity with the petition of the Board of Directors, this meeting hereby accept and confirm said amendments.

An election of President and Directors for the ensuing year was then held, whereupon Charles F. Osborne Esq., was unanimously re-elected President, and Robert Bolling, Joseph Bragg and Hartwell P. Heath Esq., were re-elected Directors.

Samuel Mordecai Esq., was re-appointed a Director on the part of the Commonwealth, and Thomas N. Lee Esq., was appointed on same behalf, in place of James S. Brander Esq., resigned.

The following resolutions were then unanimously adopted.

Resolved, That the thanks of the Stockholders in the Petersburg Rail Road Company be presented to C. F. Osborne Esq., President of the company, for the able and efficient manner in which he has discharged the duties which devolved on him, and which has tended to place the company in its present prosperous condition.

Resolved, That the thanks of the Stockholders be also presented to Henry D. Bird Esq., for his unremitted attention to, and skilful management of the department of the business of the company, which has been under his superintendence.

Resolved, That the report of the President and Directors be published.

And the meeting then adjourned.

JOHN D. TOWNES, *Chairman.*

REPORT OF THE DIRECTORS.

The Board of Directors under the obligations imposed by the charter and by-laws, and their own sense of duty respectfully report.

Immediately after your last meeting, and the present organization of this Board, they proceeded to consider what was meet and proper to be done, under your resolution, giving authority to negotiate farther loans, or create stock, in order that the exigences of the company might be provided for in the manner most conducive to your best interest. It was soon ascertained that the amount required, could not be borrowed upon favorable terms. The stock at that time being below par, and the debts of the company not inconsiderable, the board deemed it advisable under all the circumstances, to consent to the creation of new stock to the amount of $85,000, provided they could make an arrangement to do so at par. This was effected through the liberality of the Messrs. Biddle of Philadelphia: and the consequence has been a progressive improvement in the value of the stock, and the affairs of the company, from that period to the present moment. Simultaneous with this arrangement, public notice was given to the holders of certificates of dividend, of your resolution of the 2d of last March, conferring on them the privilege of converting their warrants into stock—and to those stockholders whose dividends did not amount to the value of a certificate, of the readiness of the company to discharge the same in cash. Of this debt $20,500 was converted, and $4144,86 with interest to 1st May last, was paid, leaving unpaid, only, the dividend certificate held by the state, and due in 1842 for $16,000—and of the dividends of 1834 yet unclaimed $370. All of which are more fully exhibited in the tabular statements accompanying this report. So soon as these negotiations were complete, and made public, all of the loan bonds issued in 1833 and made convertible into stock at the will of the holder, were (with a single exception amounting to $3000) converted into stock, and thus has our capital been increased from $400,000 to $602,500 its present amount. These results, proceeding from resolutions adopted and recommended by you at your previous meeting, and carried into effect under the duties thereby imposed, render further explanations respecting them now unnecessary.

The income of the company this present year is $104,260 49: last year it was $80,949 65 be-

ing an increase of $23,310 84, which is 29 per cent. more the present, than the past year. Thus showing an income, whilst we are yet in our infancy, surpassing the most sanguine expectations of the friends of the road: nor do the board believe this income will ever be diminished. On the contrary, they are convinced, from all the calculations they can make, that the progressive additions to it, will be greater hereafter than heretofore. Born as the road was, in trouble, frowned upon at its birth, and never yet caressed, the board are nevertheless confident it has now obtained such vitality and strength, that it will more than realize the ardent hopes of its friends, baffling at all times, every scheme or machination which has been, or may hereafter be projected to its prejudice. On the north we have the Richmond and Fredericksburg Rail Road rapidly completing. On the south within the short space of a year, we have grafted on our road the Greensville and Roanoke Rail Road; and proposals will soon be submitted for a bridge across the Roanoke at Gaston, connecting that improvement with the Raleigh and Gaston Rail Road—and satisfactory assurances are given us that before the present year rolls aw[illegible]e connexion will be complete, and part of the r[illegible]d on the other side of the Roanoke so far made, that it may be used for travel and transportation.

With these feeders on the north and south and at no distant day a connexion with the Yadkin country, (perhaps the finest in the south,) either at Raleigh or at Oxford, we are insured a continued and increased value to our investment: nor is it too much to anticipate, that the period is almost at hand when from the profit on travel alone, we shall declare such dividends to our stockholders, as will amply satisfy them, and consequently have it in our power to reduce the rates of transportation of produce, to the mere expense of its receipt and delivery. These results we shall more than attain, should our western fellow citizens mature their contemplated improvement; and being attained, it is for you to determine its action upon the commercial prosperity of our town.

Until the past year, the resourses of the company were very limited—the original capital was found insufficient, and a large debt was consequently contracted, and, besides, the payment of all the current debts which it was possible to postpone, were deferred,—all these have been paid with all the interest which had accrued upon them. Independent of this, almost all the materials of repair are anticipated; and instead now of being a year in arrears, we are twelve months in advance, in these respects. We have likewise discharged some of the old demands for land damages; and all the known litigated claims, with one or two exceptions, have either been compromised, or otherwise disposed of, in a satisfactory manner.

It is our duty also to inform you that we have purchased another steamboat, at the cost of $7.500, to meet the wants of the trade on the lower Roanoke and during the past year have rebuilt the tavern at Blakely, in a strong substantial and handsome manner. The cost of this establishment will be $7.600, according to contract. It will thus be apparent to you, how the funds of the company have been disposed of, when these items are added to the ordinary expenses.

You will perceive from the accounts now before you, that $41.936.19, has been this year expended beyond the actual capital of the company. This amount properly belongs to the fund to be divided among the stockholders, and it may be expedient perhaps to resort to a temporary loan to refund the amount already abstracted from this fund, as well as what may be hereafter required for similar purposes. The board, with all deference, would recommend this course being pursued, in preference to a further increase of capital; being fully persuaded, that from the profits of the company, they can derive good and sufficient dividends, and pay off gradually any debt which is now due, or which it may be hereafter necessary to contract. You will observe from the statements on your table, that our income for the year past more than meet all the charges against transportation, (we include here all of our expenses,) besides paying a dividend of ten per cent to the stockholders.

The expences the ensuing year will, according to the estimate before you, amount to $45,000. These it is believed cannot be farther diminished. Every reduction has been made, and all the economy introduced, which in our opinion circumstances permit.

The Directors have pleasure in stating, that the amount paid for losses the present year, has been comparatively small. Last year transportation was debited on this account with $5041,22; this year with $1174,12, and this too almost entirely incurred, by the burning of a car loaded with dry goods in March last. We have had no similar accident since—have burned no cotton—and trust and believe, have reduced the chances of these calamities materially by our present arrangements.

We submit to you a detailed report respecting our road, locomotives, &c. from our Engineer, Mr. H. D. Bird; and will not omit this opportunity to bring to your especial notice, the merits of this invaluable agent—the talents, energy and zeal displayed by him on every occasion, and in every trust, is deserving of all praise; nor can you too highly appreciate his devotion and zeal to your interest, and the valuable services of others in your employ.

It is confidently believed that the condition of the road is much improved. Every piece of decayed timber is carefully removed and every precaution used to avoid accidents of all kinds. Our locomotives and cars are all in good order. Our coaches need improvement, and these will be attended to, in the course of the present summer.

You will observe from the statement, we have now 7 locomotives and 100 cars, having added the past season 2 locomotives and 35 cars to our stock. These we should increase the present year, particularly if this company undertakes the transportation on the Greensville and Roanoke Rail Road. And the board would recommend to the stockholders to authorize the Directors, or some committee, to make for this purpose an arrangement with that company, being satisfied, such an understanding would promote the interest of the stockholders in each company. A similar arrangement with the Raleigh and Gaston Rail Road Company would redound to the prosperity of all concerned, and it is submitted to you, whether or not it is now advisable to give such authority to the board at your present meeting, or defer its consideration to another year.

We have applied to the present legislature through our representative J. T. Brown Esq. for an amendment to our present charter, should you concur in its provisions. A copy of the proposed amendment is before you and we are led to believe it will pass.* It asks of the legislature, as you will perceive, to put our stock on the same grade, as regards our profits and rates. with those of the Richmond and Fredericksburg road, giving a more fixed and permanent regulation to its character than the present complex plan of our charter admits—in other words fixing our maximum rate of dividend at 15 per cent. instead of a return of capital and 6 per cent. thereafter. The advantage resulting from this arrangement will be, that the actual value of the stock will always speak for itself, instead of requiring abstruse calculations to ascertain it. Moreover this alteration will furnish additional inducements to the stockholders, especially, those resident at the north, to embark in other improvements calculated to increase the present transportation on our road. It was these considerations which induced the board to make this application, and we hope they meet your approval.

The Board have likewise applied to Congress through our representative John Y. Mason Esq. for a return of duties paid by the company on car wheels with rolled tires, locomotives, &c. Should this reasonable petition be granted, we shall receive from the treasury about $16,000. We are induced to hape the application may be successful; but although right and proper in every point of view, we dare not be sanguine in its favorable result.

The Board deem it not irrelevant to express the hope that public attention will soon be directed to the improvement of Nottoway river—an improvement in the opinion of engineers easily made, requiring but moderate means to effect, and promising great advantages. But these advantages being essential to the prosperity of the counties of Lunenburg and Nottoway, we may no doubt confidently rely on the public spirit of their citizens accomplishing this important end, without much, if any aid from our community. It should be regarded by us however as one of the legitimate avenues of our trade, and consequently deserving especial consideration.

The Board have caused to be laid on your table full and distinct accounts of all the affairs of the company—they submit them for your examination, and feel entirely confident, the more you investigate them, the more will you appreciate your investment.

By order of the Board of Directors,

CHARLES F. OSBORNE, *Prest.*

Transportation on the Petersburg Rail Road.

	1834.	Total.	1835.	Total.
February,	$3.671 86		$4,532 14	
March,	5,330 06		6,458 01	
April,	7,033 09		9,622 00	
May,	7,955 29		8,762 57	
June,	6,472 97		9,188 43	
July,	4,951 36		9,249 17	
August,,	5,692 87		8,197 32	
September,	5,775 42		8,443 46	
October,	7,917 43		8,109 12	
November,	8,302 98		7,663 96	
December,	7,566 73		6,714 21	
January, 1835,	5,279 59	$75,949 65	5,964 50	$92,904 90
Transportation of the Mail,		5,000 00		10,000 00
Storage,				96 83
Nett profits from Steamboats,				1,258 76
		$80,949 65		$104,260 49

Losses by fire and otherwise, 1834, $5,041
Do do 1835, 1,174

* The amendment asked for has since been enacted by the legislature.—Ed.

STATEMENT OF THE AFFAIRS OF THE PETERSBURG RAIL ROAD COMPANY, Feb. 1, 1836.

Road, Bridges, Depots, &c. to 1835,	$506,391 68	
Depots added and improved in 1835,	3,807 61	
Repairs to Road, Bridges, &c. 1835,	7,889 53	
Land damages in old claim,	540 00	
Engines, Cars, &c. to 1835,	61,000 00	
Do in 1835,	40,970 10	
Steamboats and Lighters (doubled in 1835,)	15,943 85	
Hotel at Blakely rebuilt of brick,	10,224 84	
Mules and Horses,	1,091 22	
Wood and Coal, $1,266 97. Corn and Bacon, $696 49,	1,963 26	
Petty charges,	307 86	
Interest,	80 83	
Profit and Loss,	881 08	
Debts due to the Company, and cash in Agents' hands,	9,403 22	
Cash,	3,739 09	
Stock, old, $400,000. New $202,500,		602,500 00
Loan Bonds $3,000. Bills, &c., Custom House Bonds, $2,404 35,		5,404 35
Debts due by the Company,		9,537 14
Dividends unpaid,		25,800 00
Transportation—nett since 1st November, 1835,		20,472 97
Iron,		519 71
	$664,234 17	$664,234 17

COMPARATIVE STATEMENT OF THE AFFAIRS OF THE PETERSBURG RAIL ROAD COMPANY, 1st FEBRUARY, 1835 and 1836.

	1st. Feb. 1835	1st. Feb. 183 .	Balances. Dr.	Balances. Cr.
Capital Stock,	$400,000 00	$602,500 00	*A* 202,500 00	
Loan Bonds,	100,000 00	3,000 00		97,000 00
Notes unpaid,	32,076 08	336 94		31,739 14
Custom House Bonds,	1,540 25	2,067 41	527 16	
Dividends unpaid,	40,000 00	*B* 25,800 00		14,200 00
Due to individuals,	11,710 10	9,537 14		2,172 96
Due by do	3,580 99	9,403 22		5,822 23
Iron,	418 91	519 71	100 80	
Cost of Road, Engines, Cars, Depots, &c.	577,080 96	*C* 620,638 82		*D* 43,557 86
Steamboats and Lighters,	7,697 13	*C* 15,943 85		*E* 8,246 72
Blakely Hotel,	4,971 32	*C* 10,224 84		*F* 5,253 52
Horses and mules,	120 00	1,091 22		971 22
Fuel and provisions on hand,		1,963 26		1,963 26
Surplus undivided,	8,636 29	19,203 20	10,566 91	
Cash on hand,	971 13	3,739 09		2,767 96
			$213,694 87	$213,694 87

A In this sum of $202,500 is embraced loan bonds converted, $97,000
Dividend do do 20,500
New stock created 85,000

B Of this sum of $25,800 there is due to the state in 1842 $16,000

C Chargeable to capital.

D Of this sum, $28,640 expended in new engines and cars.

E A new steamboat and four lighters added.

F Hotel rebuilt of brick.

CONDENSED VIEW OF THE RECEIPTS AND PAYMENTS, YEAR ENDING 31ST JANUARY 1836.

Amounts of bonds, &c. converted into stock	202,500 00	
received for transportation (in 1834 $80,949 65)	104,260 49	
do from other sources	627 96	
Amount of out standing debts liquidated		210,926 91
of dividend 1st May 1835		19,880 00
of do 1st November 1835		30,125 00
of interest on pre-existing debt		3,257 30
of losses incurred in 1834 and paid this year		4,295 25
of charges on transportation and other disbursements		36,136 03
of cash in hand		2,767 96
	$307,388 45	$307,388 45

ON THE SCHEMES FOR RAIL ROADS IN NORTH CAROLINA.

To the Editor of the Farmers' Register.

Raleigh, (N. C.,)
March 12th, 1836.

It is to be regretted that your correspondent "G. L. C." observes so little ceremony in planning some rail roads, and dealing damnation to others. He seems to sit at his desk, with an open map before him, intersecting every state with projected roads, uniting the most distant towns with lead marks. Regardless of the feelings of those who have long and zealously labored to promote a favorite scheme, he dashes all their cherished hopes, by one fatal stroke of his pencil, and raises a rival enterprise to crush the first. I think, Mr. Editor, it requires accurate knowledge of the topographical features of a country, deep and mature reflection on the interests, commercial and agricultural, of that country, and a freedom from all prejudice to project rail roads judiciously. Now, your correspondent has embraced in his letter such a large district of country, that there is ground to suppose he could not have bestowed that consideration on all the projects suggested, which could constitute him an adviser to be implicitly followed. In one short communication, he settles the whole system of internal improvement for Virginia, North Carolina, South Carolina, Tennessee, and Kentucky, not omitting some slight allusions to Maryland, Pennsylvania, New Jersey, and New York. It is, in truth, a letter *de omnibus rebus et quibusdam aliis;* for, not content with so extensive a field, there are sundry other topics discussed in it.

The chief objection I have to your correspondent, and the foundation of every other, is, that by taking too large a field he necessarily advocates or condemns unjustly. It is as evident as possible, that he might, without disadvantage, inform himself more fully about the roads coming to the Roanoke. It is very gratifying to a generous mind, to yield to conviction. But really I must ask for some reason, why works, which so many are interested in, and for which so much has been done, should be abandoned, because they are opposed to other works which your correspondent prefers. What magic is there in the name of Weldon, that it should be constituted the toll-gate of North Carolina?—and nothing permitted to pass the Roanoke elsewhere? Capitalists, merchants, farmers, the people, have decided against "G. L. C." Nearly six hundred thousand dollars have already been obtained for the Raleigh and Gaston Rail Road, and the small remainder of the capital stock will soon be made up. This is proof that all do not think Weldon the only place for a rail road to cross Roanoke. Your correspondent is very indignant at what he calls an "error" of "Raleigh." The error is this—(quoted from an article signed "Raleigh," in the Raleigh Register,) "the Gaston road will intercept all the trade from the west, and the greater part of the products of east North Carolina will be shipped from its coast." I suppose one of the "facts" which will be brought to prove this an error, is the fact mentioned in the same article, of the number of vessels which sailed out of one of the inlets in November last. Transportation by water is cheaper than transportation by rail road; and it is no error to suppose that the construction of rail roads will not put a stop to shipment by vessels which ply on our coast. Vessels of the largest size cannot come into the ports of North Carolina. Is it therefore absurd to say, that vessels of a less size will bear the products of the eastern part of the state to other parts of the union, or to the West Indies? The writer in the Raleigh Register was right. The Raleigh and Gaston Rail Road will be supported by the west; and if the citizens of Wilmington are mad enough to run a road to Halifax, they will find, when it is too late, that, cut off from the west, and weakened from the east by the coast trade, the receipts of the road will not keep it in repair. The Wilmington people could not do better than to make their road to Raleigh.

Mr. Editor, it is a hard task to arouse people to a spirit of internal improvement—but, when aroused, it is a still more difficult task to keep them from wild ventures and mad projects. North Carolina has long slumbered; she is now about to become rail road mad. Roads will be projected in all directions—and unless the state shall adopt some uniform and judicious policy, her works will destroy, instead of strengthening each other. There is nothing so much needed, as a strong and clear view of the proper policy of a state, in relation to internal improvements.

I should like to see such writers as G. L. C. engaged in this task. I can see that he has thought much ,and well, on the subject. He has a mind to grasp extended and enlightened plans. I would not have him construe my disagreement, in par-

ticular cases, into a condemnation of his general principles.

There is a mistaken notion gaining ground in our legislatures—that it is right to charter every company which applies. This is a suicidal policy. Rail roads are hot-house plants—they can no more exist without a certain degree of protection, than tropical plants can grow without a shelter from our frosts.

After a rail road is chartered, the state is pledged, (and if not, it should be pledged,) to protect that road from competition to a certain extent. If the wants of the community manifestly require another work, then it is proper to charter it. I would not have this principle carried so far as to prevent us from keeping pace with the improvements of the age. But we should weigh the matter well. We should be perfectly satisfied that the work already existing is unfit to accomplish the end intended, before we allow another to be made which will injure the first.

Every rail road is an invention, so far that one was never tried before, under the same circumstances. We cannot say of a rail road, as of a wheat machine, that, because it has operated well it one place, it will do equally well in another. It is [illegible] means a fair deduction, that because a rail road [illegible] Boston to Providence has succeeded, one from *Wilmington to Halifax* will succeed. Every [illegible], therefore, is a new application of the principle, and consequently an invention. We should pursue the same policy in these inventions as in others, viz: protect the inventors from competition for a limited number of years.

I will suggest a scheme, which I acknowledge to be perfectly Utopian. I merely use it as the best means of making clear the idea I wish to convey; and perhaps some one of better judgement and greater experience, will be induced to devise some plan of the sort. Suppose we could have a certain number of *disinterested* men of great intelligence and sound judgement, chosen from all parts of the state, to compose a board o internal improvement. This board should meet annually, and all applications for charters should be laid before them. The legislature should grant all applications approved by them, and grant only those recommended.

The board must devise a general system of all the works in a state which seem to them expedient. This system would of course be subject to constant modification. The proceedings should be published from time to time, to stimulate capitalists to embark in the works recommended. When a company applies for a charter, the board should have some little regard to its effect on the entire system, but should consider particularly whether it weakens a company already chartered. There should be very strong reasons to induce the board to refuse a charter which does not injure any existing work. Every charter granted, unless it is for a work embraced in the original scheme of the board, would make it necessary to change the whole system. We cannot force the public. This board could only direct public attention to feasible schemes. They should direct, not attempt to control absolutely, public opinion. If they cannot get the works made they have recommended, they should grant charters for works approaching as near as possible to their plan. They must hold one principle as inviolable—the interest of every work chartered must be consulted, before granting a new charter. I would not let a turnpike deprive us of the chance of having a rail road; but I would not charter one rail road to destroy another.

This would be an excellent scheme if we could only find men fit for the office. But where will we find men who would lay aside self interest, and thiuk only for the public good?

The effect of such a plan, were it practicable, would be to attract capital from all parts of the union. Rail roads would spring up, as if by magic, wherever the wants of the community required them. Our hardy sons would no longer have to seek wealth and prosperity in the wilds of the west. We should have a theatre of action at home sufficient to employ all our enterprise.

I most earnestly hope that some of your correspondents may be urged by these hints, to do what *I* pretend not to be able to do—to give the world some feasible plan for promoting these ends.

P. Q.

For the Farmers' Register.

COMMERCIAL REPORT.

A prosperous state of trade prevails generally in all parts of the world—and no portion of it is deriving greater advantages, or accumulating wealth more rapidly, than the southern portions of the United States. There is no article of domestic produce or manufacture, that does not command a good price—but the great staple, cotton, surpasses all others in extent and value.

The total imports of cotton in Europe in 1835, were 1,531,500 bales, of which 1,032,600 were from the United States. Great Britain received 1,091,200 bales, of which 763,200 were from the United States. France 324,400, of which 225,500 were from the United States.

The total consumption of Europe was 1,453,200 bales, of which 1,036,850 bales were from the United States. The annual increase of consumption in Europe during the last five years varied from 25,000 to 85,000 bales. In 1835, it was about 75,000 bales. The increased import from the East Indies is considerable, and an unusually large supply is expected from thence during the present year. A contrariety of opinions still prevails as to the extent of the crop grown in the United States in 1835. Estimates vary from 1,300,000 to 1,350,000 bales. The supplies in the great southern and western markets which had been withheld, are now increasing fast, and will soon reach, if not exceed, those at similar dates in 1835. Prices, however, have materially advanced. The current rates in Petersburg are 16 to 18 cents.

Tobacco continues in brisk demand, at all prices from $5\frac{1}{2}$ to $13. Manufacturers have extended their operations, and stemming qualities are particularly sought after. The European markets exhibit no favorable aspect, except for stemmed, which is scarce, in consequence of the small quantity shipped last year.

Flour continues steady at $6\frac{3}{4}$ to $7. Large quantities will no doubt be soon received from the interior of New York and Pennsylvania, where it has been locked up by the ice for some months.

The expected increase of bank capital in this state will not be obtained this year. The legislature not having had time, during a session of three

months, to act on this subject. This may tend to retard the improvements which are now in embryo. An advance in the price of the stock of the existing banks has resulted from this neglect, and 118 to 120 per cent. is now spoken of for Virginia and Farmer's bank stocks. Petersburg Rail Road shares command 119—Greensville and Roanoke $8 or $9 advance on $35 paid. The subscription to the Raleigh and Gaston Road, which is re-opened for a limited amount, is freely taken, and the work is commenced..

The cotton manufacturing establishments are in a thriving state. The stocks of those in Petersburg, which are now in operation, command 25 per cent. premium, or more. Their goods are in request in all the southern, and some of the northern markets..

x.

March 25th, 1836.

TO SUBSRIBERS AND CORRESPONDENTS.

This number will close the third volume of the Farmers' Register. The index will be sent with No. 1. of Vol. 4, and at the same time, a list of subscribers for the present volume. The subscription list, neither at this, or any other time, can be supposed to exhibit the extent of the circulation and support of this journal—as very many new subscribers order all the back volumes: and in that manner, this later demand, heretofore has been for nearly 200 copies of each of the two first volumes, and will probably not be less hereafter, for the third, in addition to all the names which are now on the list. According to the actual list, the number of subscribers has been slowly but regularly increasing through the three years. What is better than mere numbers, it is believed that the Farmers' Register, on the whole, has at least as good a *paying* list of subscribers, as any journal in the United States. The *pecuniary support* has been such as we have every reason to be content with, and thankful for, if it should be continued without diminution. But to deserve and command a continuation, or increase, of support and patronage for an agricultural journal, depends but in a small degree on its editor—and no effort on his part will compensate for the absence, or scarcity, of the contributions of the many practical farmers, who can, and ought to be his correspondents. Such communications have heretofore formed the main value of this journal—and its greater or less future usefulness must depend on the degree of abundance, or scarcity, of supplies from such sources. A periodical that ceases to gain on the public favor, is almost certain to be losing what it had enjoyed—and especially for a journal like this, a good subscription list for any one valume, is no guarantee for the profit of the next. We therefore presume to remind our friends that a relaxation of effort to sustain the publication, may soon change its prosperous condition to one of decline, and even ruin.

Various things connected with our peculiar position, and private circumstances, together with the novelty of the undertaking in this region, have at different times affected injuriously the mechanical execution of this work. The causes of such effects have never been voluntarily permitted to exist, nor were they produced by any wish to avoid making proper and sufficient expenditures—and every offence to the eye, in the quality of paper, or of printing, has been to us a source of deep regret and mortification. Such things are scarcely to be avoided at all times, in the infancy of such an establishment, or in a publication office on a very small scale, where the deprivation or neglect of a single facility, or means, may cause serious injury to the execution of a work, when the publication cannot be delayed. We have found that it is impossible to have first-rate printing executed, at all times, upon a single publication alone—and on that account, and to insure the command of sufficient and suitable labor and facilities at all times, we are now incurring the expense and risk of establishing a job printing office, which, for book work, especially, will be equal to any in the state. The necessary arrangements are made, and are just now in operation—and whether we may gain or lose by this extension of business, the measure will be the means of insuring the printing the future volumes of the Farmers' Register better than any previous one. It is also hoped that our experience of paper-makers, and sellers, has been bought dearly enough to secure us hereafter from such impositions as we were compelled to submit to, (and without even any saving in price,) in parts of the first and second volumes. There has been no such fault more recently, as to the quality of paper—and it is expected that the existing arrangements will prevent any future complaint on this score. In every other respect, no effort, or reasonable and proper expense, will be spared to render the publication deserving of all the favor and support that it may receive.

GEOLOGICAL SURVEY OF NEW YORK.

The Secretary of State of New York, acting under the previous order of the legislature, has reported a plan for a geological survey of that state, on a liberal and magnificent scale. The details of the plan we will publish hereafter. According to the eatimate of the report, the survey and publications connected with it, will cost $104,000, and four years time and labor will be required for the complete execution. The legislature has approved the report, and appropriated $26,000 for the operations of the first year.

SEASON AND STATE OF CROPS.

Though another month has passed since our last remarks on the season, and that, the one which usually brings the most marked changes of temperature, and movements of vegetation, yet the words then used would be nearly correct now. In all March, there have been but two or three days mild enough to suit the time of year—and as late as this day, the 25th, winter weather continues. Vegetation has scarcely begun —and the general predominance of wet, as well as of cold weather, has made the preparation of land for spring crops even more late than the commencement of spring weather.